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The Architecture of the Synagogue

By William G. Tachau

THE study of the synagogue is the study of the history of Israel. No period of its existence is conceivable without this place of public worship and religious instruction. Very early the synagogue became the central institution of Judaism and owing to its existence, later on, after the dispersion, the very life of the faith was preserved.

It is probable that the synagogue existed even during the period of the Temple, but it is certain that places of congregation during the exile in Babylon offered the beginning of the present houses of worship.

To give an adequate accurate critical survey of synagogal plan, it is necessary to trace its history from its inception. The earliest actual place of worship of the Jews is known as the tabernacle, which, in arrangement, was fundamentally a repetition in movable tents of the triple Egyptian Temple system that consisted of court, hall, and cella. The enclosure around the tabernacle formed a court twice as long as it was broad; there were twenty-one columns upon the sides and eleven upon the front, erected like tent poles. These supports had silver capitals and stood in sockets of bronze. White, immovable hangings were fastened between these columns, except at the entrance on the eastern front, where movable curtains of blue, purple, and scarlet linen filled the open spaces.

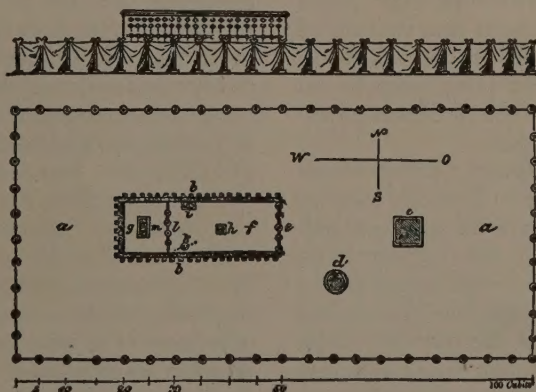
Elevation and plan

The tabernacle itself was placed near the western end of the enclosure, and in the square place in front of it rose the altar of earth and wooden sheathing for burnt offerings, and near at hand stood the laver of brass. The tabernacle was enclosed on three sides by boards overlaid with sheets of gold, held in place by double sockets of silver, which in turn were clasped together by bars that fitted gilded rings. The eastern front was limited by five gilded columns. The roof again recalled the tent form—its covering being of colored linen and the skins of animals.

The tabernacle, like the Egyptian Temple, was three times as long as it was broad, and was divided into two unequal compartments—the front being twice the depth of the Holy of Holies, the altar for incense standing in the centre of the first space and the table for the shew-bread being placed next to the northern wall. In the south-western corner stood the seven-armed candle-stick. The Holy of Holies, square in plan, was separated from the larger antechamber by four gilded columns, which also

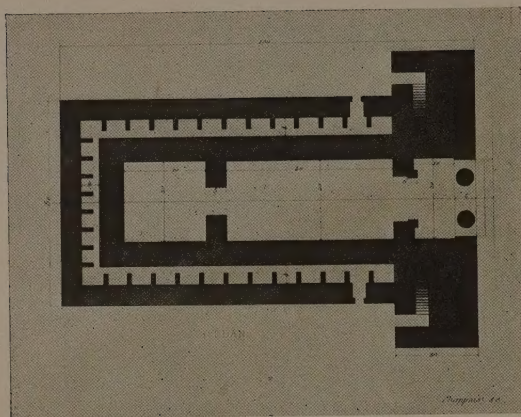
stood in sockets, and it contained the Ark of the Covenant—a coffer of acacia wood, borne upon poles fixed in golden rings, whose lid bore figures of two cherubims, carved in wood and overlaid in gold.

The form and arrangement of the tabernacle are, in the main, quite well defined, but this, unfortunately, is not true of the monumental temple erected



Elevation and plan of Mosaic Tabernacle

NOTE: The textmatter and some of the illustrations are part of an exhaustive treatise on the subject in "The American Jewish Year Book 5687."



A restored plan of the Temple of Solomon

by King Solomon. The accounts and descriptions of this building are both confused and conflicting, as may be expected from writers ignorant of art. It seems generally agreed upon, however, that the Temple consisted of an open vestibule (*Ulam*), the Holy Place (*Hekal*), and an inner chamber known as the Holy of Holies, which was elevated above the level of the Temple proper. In front of the vestibule sprang two columns, Boaz and Jachin; a large court surrounded the Temple. In the Holy of Holies nothing was visible but the cherubim, intended to enshrine the Ark of the Covenant, in which the Tablets of the Law were kept. An altar of incense and a large table for the twelve loaves of shew-bread were enshrined in the sanctuary. The seven-armed candle-stick also appears, just as in the tabernacle, to which were added ten lamp-holders and other lesser utensils. Inside the vestibule were placed a large iron altar and a spacious reservoir called the "Iron Sea," which was supported upon twelve iron bulls; groups of three were so arranged that they turned in the direction of the cardinal points of the compass.

After the return from captivity another item for speculation presents itself. If public worship became sufficiently important to demand special housing other than in the reconstructed Temple, then the structures were undoubtedly largely Assyrian in character. The Temple has always been looked upon as the true prototype of the synagogue, even though there is but a slight physical resemblance between the two buildings. Nevertheless, there are certain features in the Temple that undoubtedly left their impress upon the synagogue.

The main body of the synagogue, for instance, easily recalls the porch (*Ulam*) which in the Temple was the space given over to the needs of the congregation. The suggestion that the porch corresponds to the *pronaos* of the Christian basilica or the narthex of the Gothic church is refuted by the fact that practically all of the earliest synagogues had no vestibules. The *Hekal*, which was reserved for the priests and contained the seven-armed candle-stick, the table for the shew-bread, and the altar of incense, is now symbolized in the synagogue by the *Bima*, or *Almemar*. This is a raised dais which is used for the reading of the Torah and contains a table on which the Torah is laid, symbolic of the old order of table for the shew-bread. The elevation of the Holy of Holies of the Temple is recalled in the steps and platforms in front of the ark, from which the Torah is taken and exhibited to the congregation with prescribed ceremonies. After its reading it is replaced in the shrine.

These two elements are usually separated from the rest of the synagogue area, and are connected by an aisle which provides space for processions. The *Almemar* is either square or octagonal in plan, is raised above the floor, and has seats protected by a balustrade. Very often it is covered with a baldachino and is constructed of wood, iron, or sometimes stone. The termination of the steps leading to the Holy Shrine, as part of the *Hekal*, is indicated by the placing of the Hanukkah candle-stick (*Menorah*) usually on the south side, which is probably a substitute for the seven-armed candle-stick of Solomon.

The Holy of Holies, originally designed as the space for the Ark of the Covenant, is always raised above the floor level, and is placed against or in the wall that lies nearest to Jerusalem. A richly embroidered curtain (*Parodet*) usually hangs before the door of the shrine as a symbol of the partition between the *Hekal* and the Holy of Holies that was used in the Temple. These two elements then, the Holy of Holies (Ark) and the *Almemar*, from earliest times formed the basis of the plan of the synagogue, and occurred in all structures, being used even as late as the beginning of the nineteenth century. The term *Almemar* is a corruption of the Arabic *Al-mimbar*, which means the chair or pulpit, and is more commonly used than the Talmudic word *Bima*.

The question whether the Holy Shrine should look toward the east or toward the west occupied

the minds of the teachers even in Talmudic times. Thus, for example, Rabbi Abin (Jerus. Berakot 4, 8c) remarks that the aspect toward Jerusalem and the Temple could be effective only for the time of the duration of the latter. Quite contrary are the opinions of Rabbi Ishmael (second century) and Rabbi Oshaya (third century), who said on this question: "The Head of God is over all" (Baba Batra 25a). Finally, Rabbi Sheshet (fourth century) forbade the eastward aspect as a heathenish use. The prescription of the Shulhan Aruk reads as follows: "The door may not be otherwise set than opposite to that side toward which one prays in the particular city. If one prays to the west, the door should be on the east side, so that one can bow toward the ark from the door."

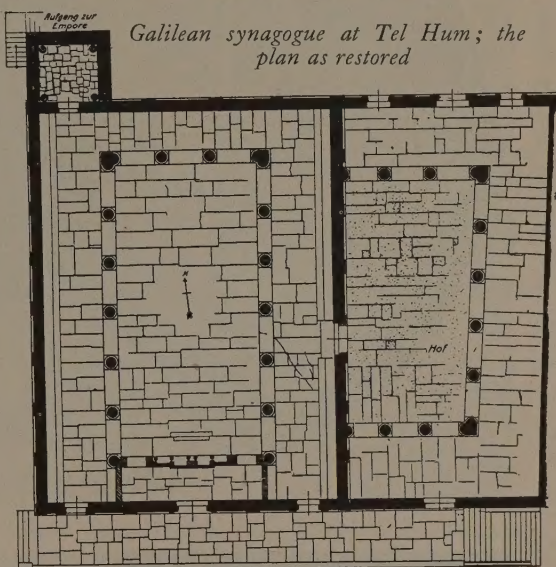
There seems to be no mention in the codes of the women's part in the services in the synagogue. In the Bible (Deut. 31 : 12) the duty of the women to be present at the public reading of the Law is prescribed. It also appears that the injunction (I Cor. 14 : 34) "Let the women keep silent in the church," was strictly observed.

There are further legal references which it might be interesting to quote, except that they have no direct bearing on the arrangement of the plan.

There are numerous ruins of synagogues scattered throughout Galilee which were first discovered in 1852. Some of them have since been excavated. The period of their construction has not been definitely fixed, as there are no inscriptions yet unearthed that give an actual date, but a comparison of their details of decoration with other buildings of this locality places them somewhere between the second and the fourth centuries C. E. Until that period, then, the study of the synagogue is entirely documentary, so that in these ruins we have the first real concrete evidences of the synagogal plan. In the very capable work, "Antike Synagogen in Galilæa," Messrs. Heinrich Kohl and Carl Watzinger not only have illustrated the actual conditions of the excavations of eleven of these ruins, but have produced very interesting ideas for their restoration. There is great similarity in these structures, which are all of the basilica type, showing three entrance doors in the wall nearest Jerusalem, in every example but one. The buildings are divided into a nave and two side aisles by two rows of columns which support a balcony on three sides. The roof is supported by superimposed columns.

The Ark, according to these authorities, is

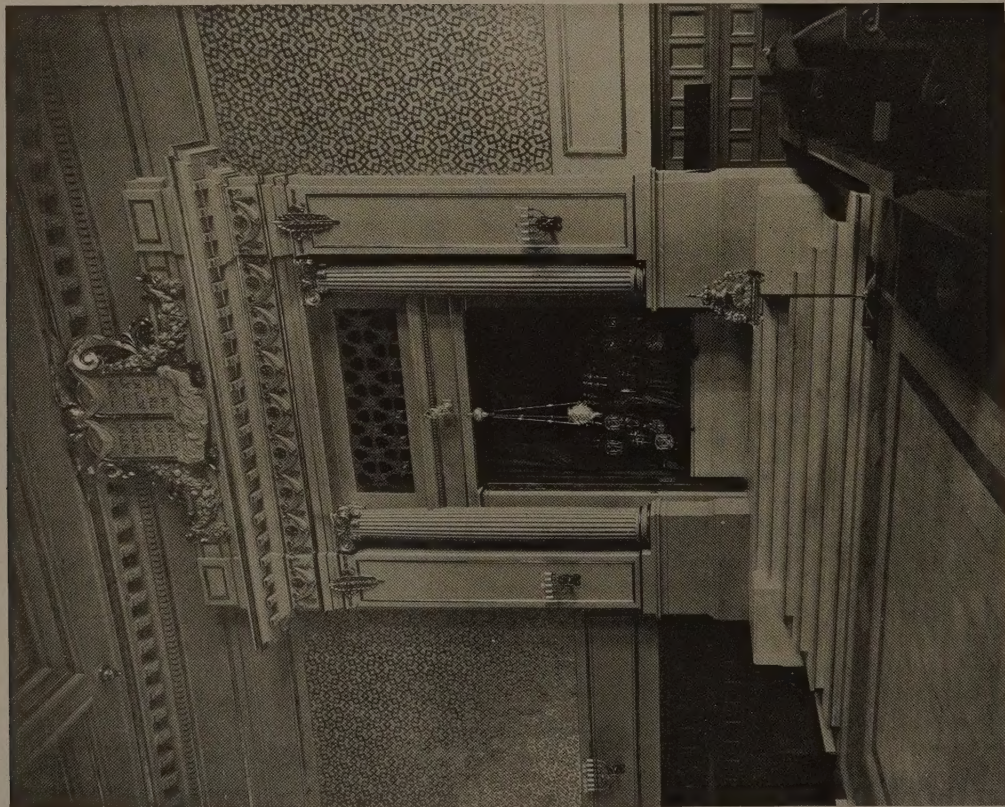
placed between the last two columns in such a way that the central door is blocked, which forces the real entrance through the two side doors. The reason for the main door, which is shown not to have been used for entrance, is obscure. There are no actual remains of the



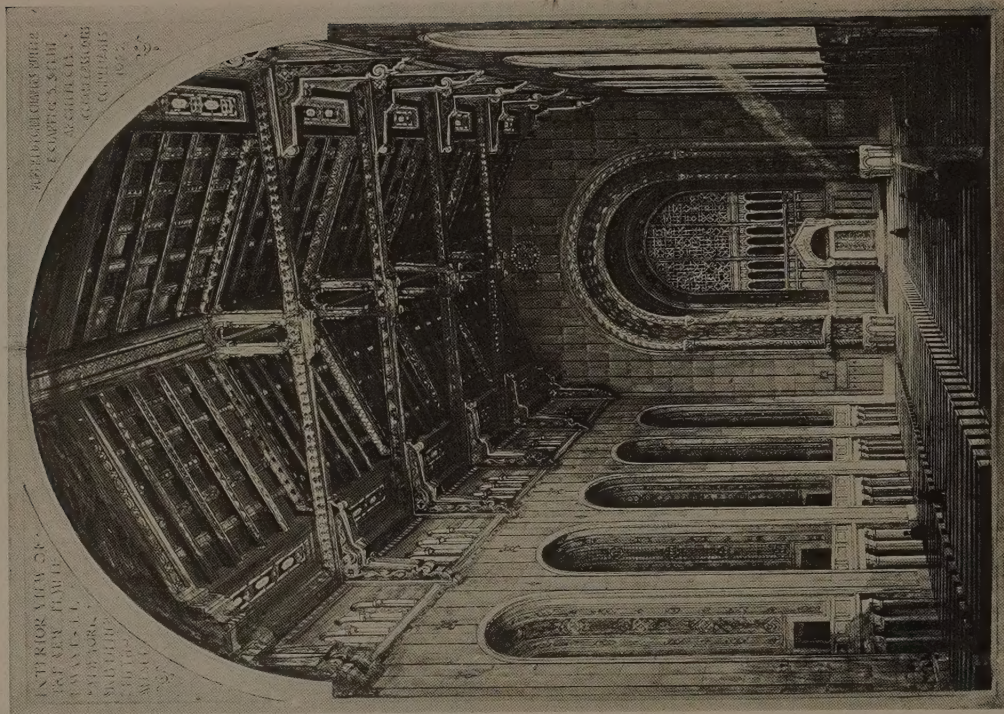
Almemar or the Ark, which were probably movable and constructed of perishable material.

The plan of Tel-Hum, which is here given, shows an open court with a row of columns on three sides. The floor is paved with rectangular slabs of stone. The stairs to the balcony appear at the northwest corner, and there were stone benches all around the room, except at the entrance wall. At Irbid, owing to the conditions of the building site, the entrance is from the east and the nave is dropped several steps below the aisles.

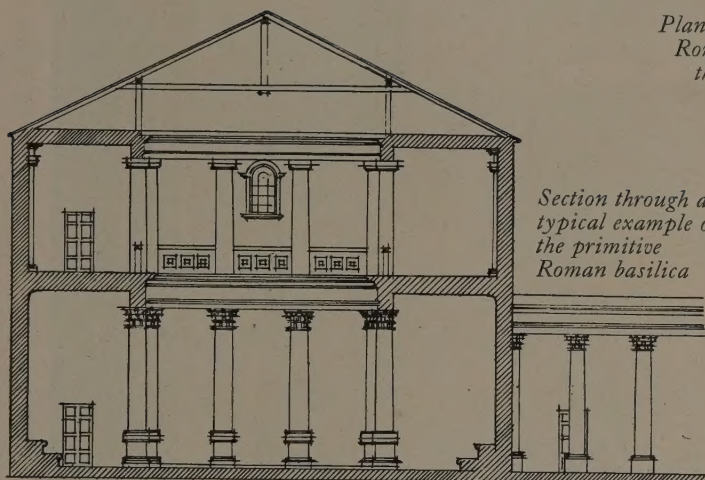
In 1921 a synagogue at Aim Duq, near Jericho, was unearthed, which also is in the basilica form, and the floor of the nave is covered with interesting mosaic, divided into three large panels. The first panel represents a Menorah; the second shows the Signs of the Zodiac, beautifully drawn with all of the emblems; and the third depicts the scene of "Daniel and the Lions." There are inscriptions in Hebrew entirely intact, but the figures, especially the faces, are partially destroyed, and this is a sure indication to some authorities that the work of destruction was done by the Jews themselves. These findings of the last-mentioned synagogue have as yet not been published, but this information is due to the courtesy of Mr. E. L. Sukenik.



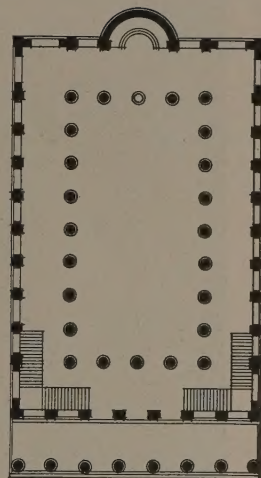
The Ark of Mikveh Israel, Philadelphia, Pa. Tachau & Vought, Architects



Interior of Temple Emanu-El, New York City. Robert D. Kohn, Charles Butler, and Clarence S. Stein, Associated Architects; Mayers, Murray & Phillip, Consultants



*Plan of a primitive
Roman basilica—
the typical form*



Relying on the discoveries made in these buildings there are those who claim that the Talmudic laws were formulated only at a later date. There is no doubt that human and animal figures were introduced in the decoration, which is explained by the assertion that at first the law against "graven images" forbade their worship, but not their presentation, and that the modern interpretation was an aftergrowth. The remains of the decorative motives prove them to be Greco-Roman, and they show startling resemblances to the Byzantine character of ornament, as exhibited in Constantinople and even central France.

There is a belief that the plan of the synagogues of Galilee was derived from Greek edifices (there are buildings of this type at Delos and at Miletus), and the synagogue at Alexandria, which was of an earlier date than these, is described as a basilica, or "like a big basilica." Undoubtedly this theory, which formulates the belief of a Greek origin, could be applied to synagogues of a much earlier date, but it is logical to suppose that these buildings of Galilee, which show such decided resemblance to the neighboring Roman edifices, were copied from them or at least were inspired by Roman influence.

It is interesting to note that the synagogue derived its main form from the same source as did the Christian church and at an even earlier era. The Roman basilicas existed in all parts of the Empire and were the most convenient structures then existing for purposes of congregational worship. They were used by the Romans for law courts, the merchants' exchange,

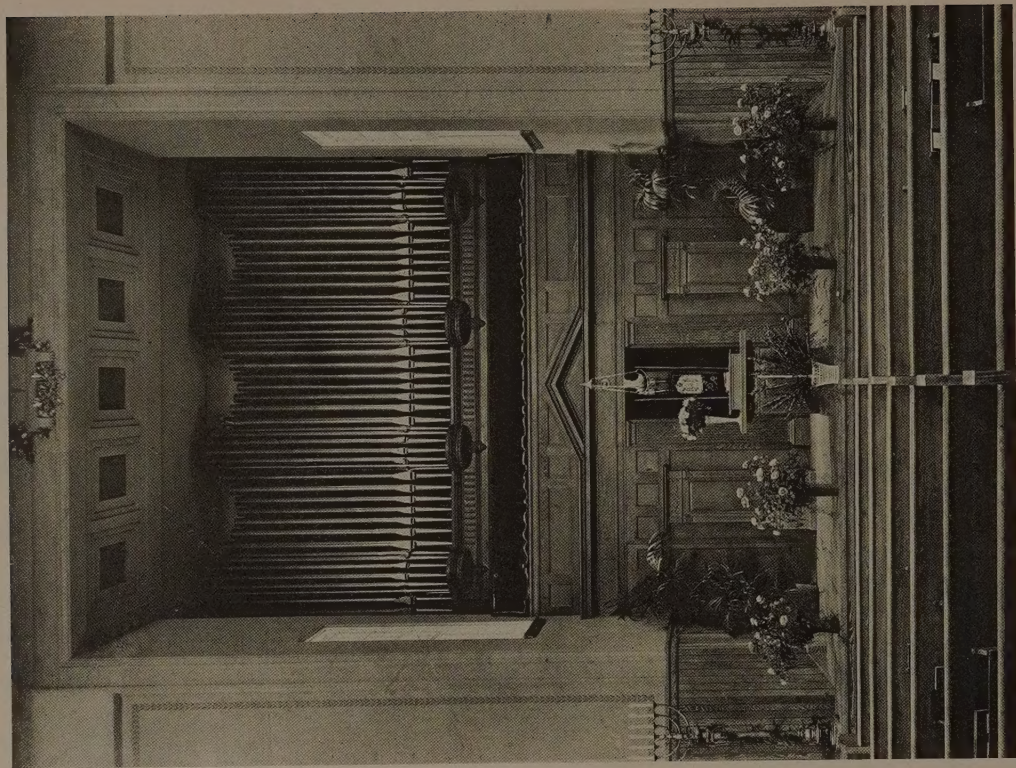
and market hall; no province being entitled to municipal privileges which did not possess one. The principal room in the palace or large house was called a basilica and was constructed on the same plan.

Here was an arrangement, already at hand, quite suited to the needs of religious services, which served as a model for the synagogue as it did later for the Christian church. The plan was uniform, consisting of a parallelogram divided longitudinally into three parts by two rows of columns or pillars, with galleries over the two outside divisions, supported by the columns and the exterior walls. At one end was a tribune for the judges, arranged in a semicircle. In a few instances there was a tribunal at each end, with entrance at the side. This general plan for the synagogue, like that of some Christian churches, has persisted until the present day.

One of the first changes in the basilica plan that manifested itself in the Christian churches was the introduction of a transept, thus producing the cruciform plan. In the western part of the Roman Empire the plan developed was that of a Latin cross—the transept being short and the nave long. In the eastern part, the plan developed was that of a Greek cross, the four arms being of equal length. The synagogue plan never developed the Latin form, but there are examples of the Greek type in those localities in the East which came in contact with the similar forms in Christian churches and Mohammedan mosques. In very recent times there is a distinct tendency toward this Greek form, as will be shown later, which, curiously enough, was reinspired by eastern models, aided by



*The Ark of Temple Israel, New York City.
Tachau & Vought, Architects*



*Beth Israel, Atlantic City, N. J., looking toward the Ark.
Tachau & Vought, Architects*

exigencies of modern construction and the desire to seat as many persons as possible near the reading-desk.

There is still another type of plan, of which there are many examples in central Europe, that persisted from the eleventh to the eighteenth centuries. This has a hall divided into two aisles by a central row of columns, usually limited to two in number. One of the oldest synagogues of this character is found at Worms. Indeed, it is believed by some to be the oldest synagogue still standing in which services are held. The entrance is through a single door in the south. To the right are steps that lead to a balcony; on the left are the alms boxes. The main room is divided into two aisles by means of two columns, and between them is located the square *Almemar*, served by steps on either side. The Ark is placed against the east wall on the axis of the room, flanked on either side by brass Hanukkah candle-sticks. The women's section is to the south, its ceiling vaulting springing from a single column in the centre of the room. To the west stands the so-called Rashi Chapel, which today serves as a reliquary. This type of two-aisled plan is found not only in the old synagogue at Worms, Germany, but also in Prague, Bohemia; Regensburg, Austria; Passau, Galicia; Astrog, Russia; and Damascus, Syria.

It is claimed by some authorities that the employment of two columns was neither accidental nor occasioned by constructive necessities, but that they were consciously used to represent the two columns, Boaz and Jachin, that flanked the entrance to Solomon's Temple. But a more advanced research reveals numerous examples in German Christian churches, where the two piers or columns have been employed to divide the building into two aisles and to decrease the span of the vaulting. Beyond a doubt, then, this style of two-aisled synagogue was borrowed from co-existing religious edifices, and we must abandon all thought that here at least the Jews had developed a distinct architectural motive of their own.

And so it is evidenced that the synagogue in general adopted three types of plan: the basilica, the Greek cross, and the two-aisle type. But no matter which one of the three types was selected, the arrangement for the conduct of the services and rituals remained fixed, and continued unchanged until the nineteenth century. The Ark was placed against the short wall, situated nearest Jerusalem, and was elevated upon a platform and served by steps. The *Almemar*, or

reading-desk, also elevated above the floor, stood in the centre of the room facing the Ark, and a wide aisle connecting the two furnished ample space for the procession and ceremonials. The women, being assigned to a separate section that was located either on the ground floor or in an upper story, had no view of the services; indeed, they were actually cut off by a pierced partition or by a grille, and no provision of any kind was made for their comfort.

This arrangement is still adhered to in the edifices of orthodox congregations, the only modification being a little more favorable to the women who, though still segregated, may enjoy the privilege of seeing and being seen.

The early part of the nineteenth century saw great changes in the condition of the Jews. Their emancipation from the seclusion of the Ghetto brought them into closer association with the refinements and culture of their neighbors. The long centuries of restraint were cast behind them, and they felt free to participate in the common life of the community, and therefore had the desire to express themselves and reveal something of the powers that were stirring within them.

The hold of tradition upon the individual became less significant, external religious observances gradually lost some of their importance, especially within the family, so that the synagogue became more and more the centre for the preservation of Judaism. The Jews found that the religious edifices of their neighbors made an appeal to the emotions of the worshippers through beauty of form, through the subtle charm of subdued lighting, and through harmonious sound, and so they began to emulate these characteristics in order to stimulate the religious interests of their own people. It was, therefore, not merely the love of ostentation that caused these changes, but a real desire to make the synagogue an inspiring place of worship to the congregation.

The first synagogue in which reforms were carried out was the Reform Temple Verein at Hamburg in about 1817, and it was at this period that the name "Temple" came to be used to designate the synagogue of the reform congregation. This use of the term Temple was the result of the position taken by advocates of Reform Judaism that Israel was no longer in exile and that every house of worship was a temple, just as sacrosanct as had been the Temple at Jerusalem.

The curtailing of the ritual made the great-

est changes in the plan of the building. The large space surrounding the *Almemar* was eliminated, as it was no longer needed after the suppression of the processional, and the reading-desk was moved to a platform directly in front of the Ark; the elimination of this aisle space permitting an increase in the number of seats. The high lattice or grille concealing the women was abolished, and they were even allowed to take their places beside the men of the family. The organ was introduced, with a choir, and was placed either near or above the Ark or directly opposite to it in the balcony over the entrance; stationary benches or pews were introduced superseding the old movable desks. The fore court was reduced to a simple vestibule, and in many cases no thought was given to orientation, so that the congregation no longer faced Jerusalem when at prayer. A large section of the Jews, however, did not subscribe to these changes, and their buildings retained much of the older arrangement for services, but even they abolished the high screen, though the women were still segregated. It was at this time that the galleries, which existed in the basilica type, began to be utilized exclusively for the women, and this procedure came into general use and, with few exceptions, continues to be the most popular form to-day.

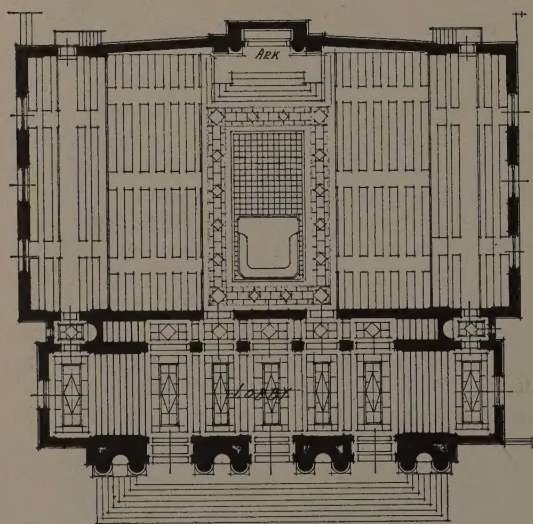
One interesting variant, however, is to be found in the new Mikveh Israel Synagogue in Philadelphia. Here it was decided that it was too much of a physical hardship for the women to climb to a high gallery, so the old idea of stationing the women's section near the ground

level was revived. It is arranged on either side of the building, and can easily be reached by a few steps leading from the common vestibule, which lies in front of the hall of worship. The *Almemar* is near the long west wall between the two entrance doors for men and opposite the Ark, which is here developed into the principal architectural motive of the interior. An aisle, large enough to permit of the processional, connects the *Almemar* with the Ark. It is probable that this synagogue boasts the only arrangement of this character in America.

Another interesting variant occurs in the plan of the Shearith Israel Synagogue in New York. The location, on the west side of an avenue, forced the entrance in the east wall of the building. In order to retain the proper legal orientation, the Ark is placed between the entrance doors, and the congregation is veered about on entering, so that in prayer they may face the Ark and look toward the east. This arrangement is like that of the Galilean synagogues, but was arrived at independently, as at the time of construction the Galilean excavations had not been completed.

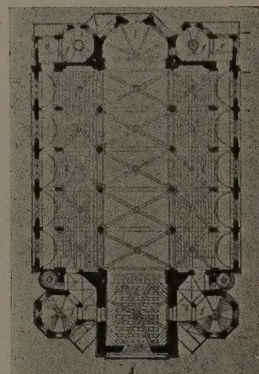
Types of plan other than the basilica (except in some few instances in the East) were gradually abandoned during the nineteenth century by both the orthodox and reform synagogues of Europe and America. Tradition was strongly in favor of this form and it was the only one that adequately fulfilled all the requirements then known. The growth of congregations, the increased demand for seating space, and the high cost of building sites, which necessarily confined ground area, made the retention of the galleries almost imperative.

Other activities which were connected historically with places of worship, such as school rooms and halls for social purposes, began to



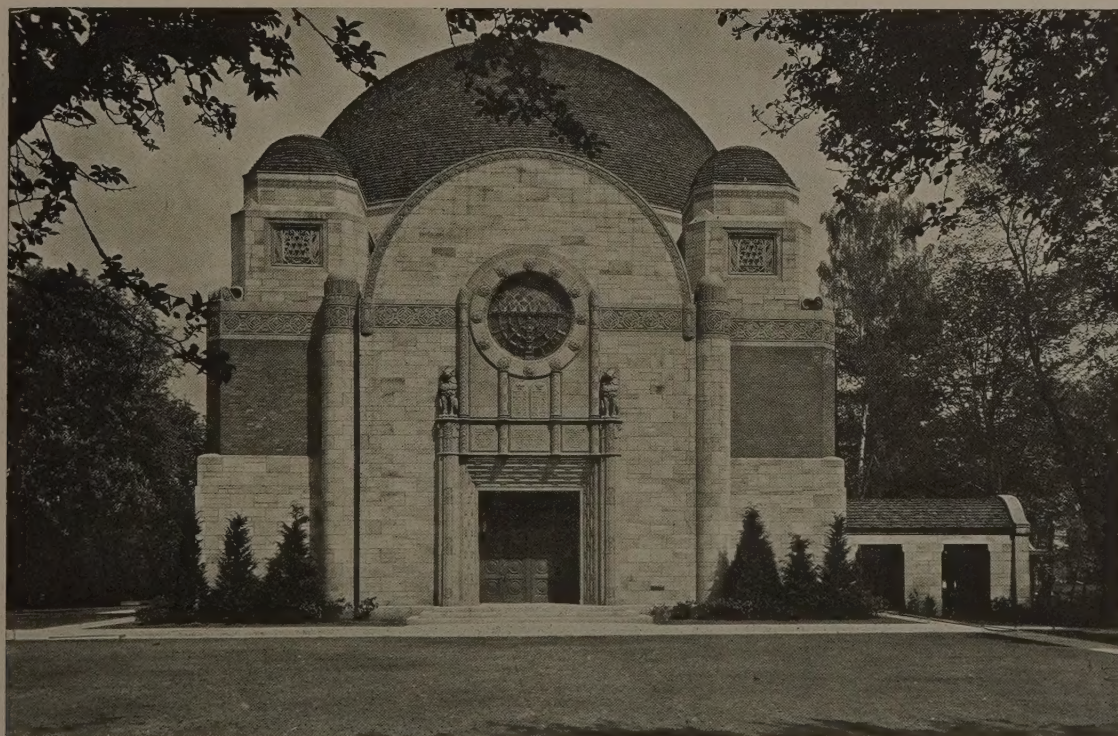
The unusual plan
of Mikveh Israel,
Philadelphia

Plan of the synagogue
at Munich, an
elaborate development
of the basilica type





Temple Emanu-El, New York City, now building. (Plan on page 141)



Temple Beth Israel, Portland, Ore., recently completed. (Plan on page 141)



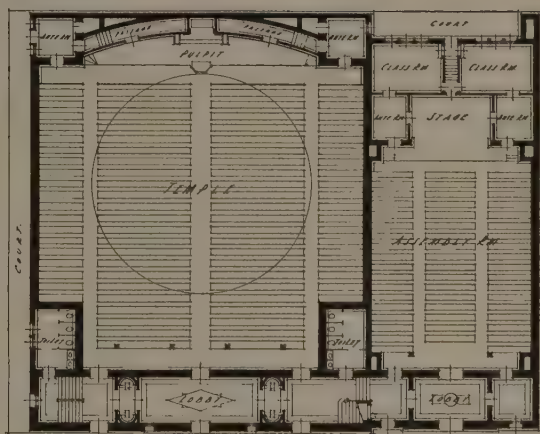
Temple Emanu-El, San Francisco. Bakewell & Brown and Sylvain Schnaittacher, Architects

take on a more important rôle, and as these rooms were almost invariably placed in the basement under the synagogue, it was found that the long narrow type of plan afforded a greater area for admitting outside light. The columns that supported the galleries, continuing up, also made the construction of the roof more simple, and the narrow auditorium was easily lighted by side windows, even if placed on a narrow court, which was usually the case in large cities. This basilica type of plan was carried to the highest development with important vestibules, staircases, and elaborate arrangements of piers and vaulting. An example of this style may be seen in the synagogue at Munich.

No sooner, however, had this plan been settled upon than defects of great importance became evident. As the building grew larger, the depth of the hall became so great that those in the rear had difficulty in hearing and seeing the services. The galleries were uncomfortable, and it was hard to see from such a distance the activities taking place around the Ark. There was also the extra effort of climbing the stairs. All these discomforts tended toward making the seats in the galleries undesirable, and those that were forced to take them were of necessity the less wealthy members of the congregation. This ultimately led to certain demoralizing social distinctions. Furthermore, the columns that supported the balconies and roof obscured a clear view of the Ark, and consequently were a source of annoyance.

The architects strove valiantly to overcome these defects and resorted to many expedients, but none of them proved entirely satisfactory. The floor was inclined toward the Ark to counteract the great depth of the auditorium, and this improved the view and had a consequent physiologically beneficial effect upon the hearing. Likewise, the steppings in the balconies were increased in height, and this somewhat improved the sight lines, but it did not increase the comfort.

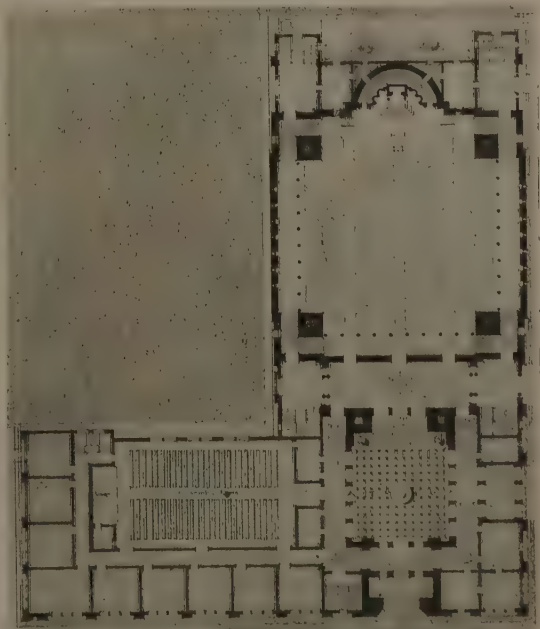
In some cases the stairs leading to the balcony were arranged to ascend from the body of the hall instead of from the vestibule, so that at least there would be no distinction on entering and leaving the building. This arrangement, however, increased the difficulty of exit after services, the noise of those mounting the stairs was often distracting, and the stigma of balcony seats remained. The columns supporting the balcony, following the precedent of the theatres



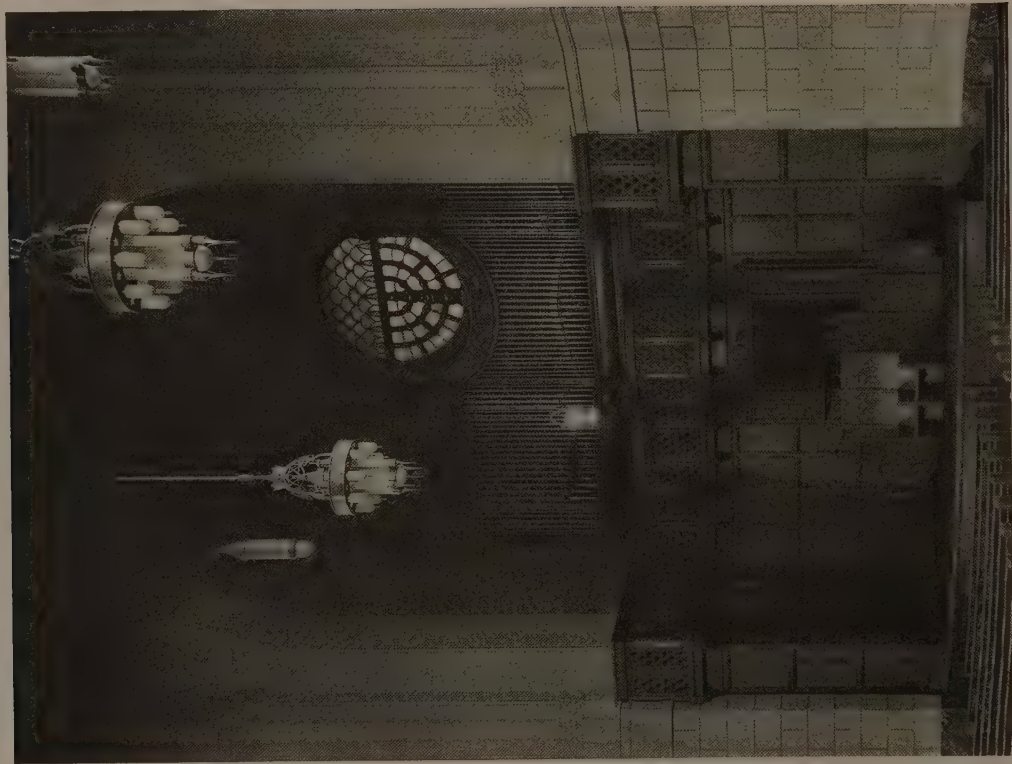
Plan of Temple Israel, New York City. Tachau & Vought, Architects (Interior view on page 134)

of the day, were reduced to a minimum in size, and they, with the accompanying decorations of wrought-iron arches and brackets, were left exposed. This reduced the interruption of sight lines, but detracted largely from the dignity of the interior.

Such was the condition that existed in the beginning of the twentieth century throughout Europe and America. It will be interesting to follow the difficult paths of the architects who tried to correct, as well as they could, the defects that have here been indicated.



Plan of Temple Emanu-El, San Francisco. (Exterior and interior views on page 138)

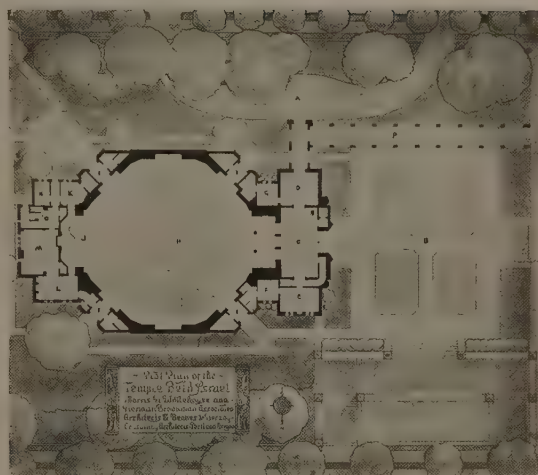


Temple Beth Israel, Portland, Ore., with the seven-armed candle-stick motif in the window



*Sinai Temple, Mt. Vernon, N. Y.—the Ark.
Tachau & Vought, Architects*

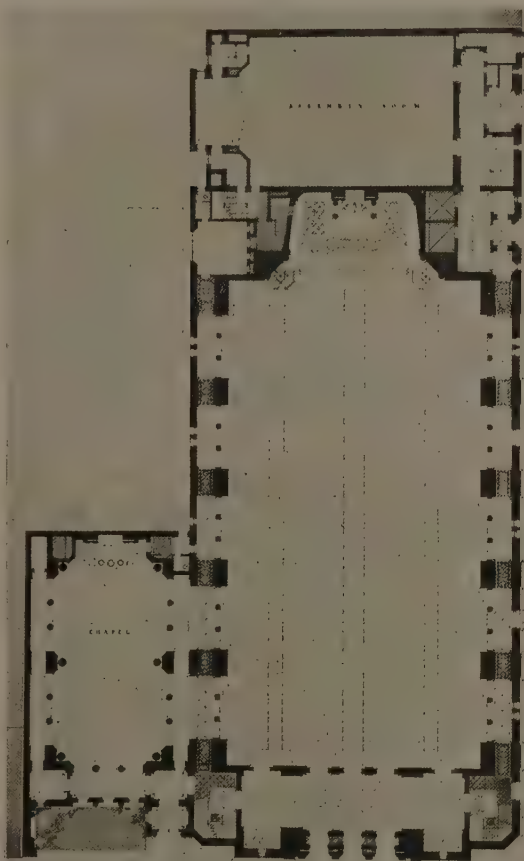
The first effort to do away with the annoyance of columns was naturally to reduce them in numbers and to place those that were retained in such a manner as to interfere as little as possible with the view of the Ark. The columns above the gallery and those supporting the roof were eliminated entirely. In the smaller buildings the side balconies were omitted altogether, as seats situated there were of little value, and the supporting columns were the most trouble-



Plan of Temple Beth Israel, Portland, Ore. Morris H. Whitehouse and Herman Brookman, Associated Architects; Bennes & Herzog, Consulting Architects

The widening of the auditorium made the plan more nearly square in form. The elimination of the columns supporting the roof required a change in the ceiling arrangement and construction. It was still felt that the demand for increased seating capacity necessitated the retention of the balcony.

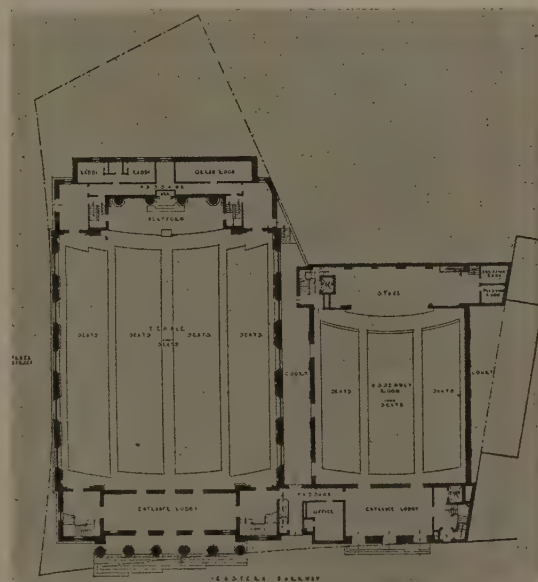
The designers now began to search for an architectural form that would best express these requirements, and found it in the churches and



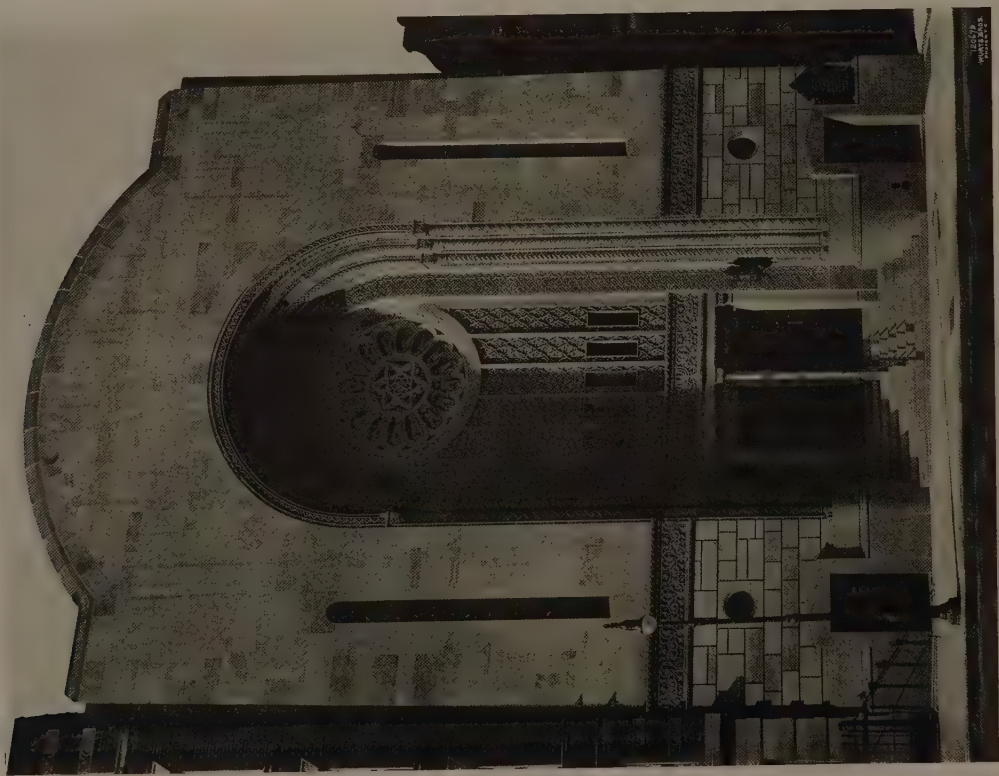
Plan of Temple Emanu-El, New York City. (Exterior on page 137; interior, page 132)

some to handle. The rear balcony was retained and was carried back over the entrance vestibule; the few columns required for its support annoyed only a few seatholders in the rear of the hall.

In the larger synagogues the desire to bring all the seats as near to the Ark as possible necessitated enlarging the width of the hall, and the pews were placed on a curve, with the pulpit as the centre. The slanting floor was retained.



Plan of synagogue and communal house, Unity Temple, Brooklyn, N. Y. Arnold W. Brunner Associates, Architects



Synagogue of the Congregation Ohab Zedek, New York City. Charles B. Meyers, Architect



Sinai Temple, Mt. Vernon, N. Y. (Plan on opposite page; interior on page 140)

mosques of the Near East. The Greek cross plan, supporting a pendentive dome, seemed a splendid solution, which was strengthened by historical precedent. The square plan was achieved; the arms of the cross furnished ideal recesses to receive the balconies; and a graceful roof covering was assured.

The cantilever system of support that had been developed in theatre construction was a modern idea that could here be used to good advantage, and it was soon seized upon, with the result that the columns under the balcony could be eliminated. A number of buildings of this type have been erected, usually, however, with many variations upon the original prototype. One favorite device is to eliminate the masonry under the four arches supporting the dome and to hold them up by a single column at the corner intersection. This treatment, however, is found to produce an effect of instability, with a consequent loss of dignity. Recently a number of plans have been developed in circular, elliptical, and polygonal forms, which again owe their inspiration to Byzantine influence.

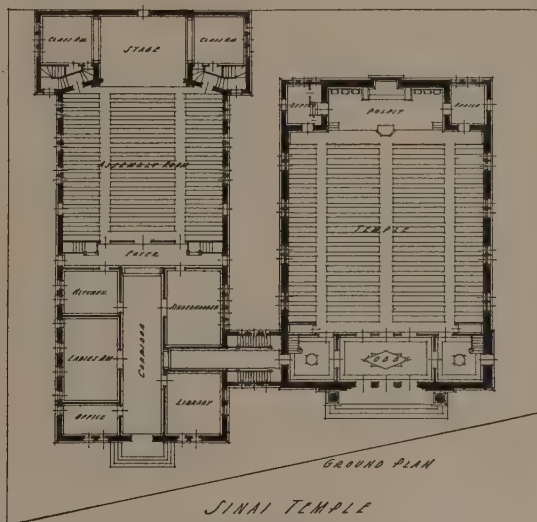
To obtain the imposing effect that such designs require, the dome must be of a lofty character and so pretentious a venture can be accomplished only at great cost; and in many instances such height results in poor acoustics—a very serious defect in an auditorium.

Some architects, either because they have an aversion for the Greek cross type or because the conditions of the site necessitate it, have changed this Byzantine form by widening the lateral arms, which brings the plan back more nearly to the basilica type. When this occurs, the side balconies are usually omitted, as are all supporting columns; and the roof is kept flat, with coffers or panels. There are also examples of the Greek cross plan and its variants which are surmounted by a square or octagonal dome. This plan is advantageous because an appearance of height may be attained, although the ceiling remains low enough to avoid acoustical difficulties. As will be shown later, these types of plan, although inspired by the Byzantine, have been successfully carried out with classic details and ornamental adjuncts.

A very interesting development in synagogal plan that has confronted the architect in the last few years is the desirability of establishing a "social centre" in connection with houses of worship. The idea sprang from a desire to widen the scope of religious influence and to awaken the interest of the younger members of the com-

munity to their religious and social obligations. These buildings are usually placed in conjunction with the Sabbath school, so that the classrooms during the week days can be used for various social activities.

The chief element is the auditorium, which is primarily the assembly-room of the Sabbath school, and it usually has a stage at one end



Plan of Sinai Temple, Mt. Vernon, N. Y., with its community house.

that can be used for theatricals and the showing of motion-pictures. It can also be utilized for dances and other social affairs. A gymnasium is considered to be a necessity. A series of rooms are also required for women's activities, in which girls' clubs can meet and where classes in sewing, cooking, and the domestic arts find adequate space and comfort. The kitchen is usually placed conveniently near the auditorium and the ladies' room. Boys' club rooms are also included in the scheme and a swimming-pool and bowling-alley are part of the programme. Very often a chapel forms one unit in the group of buildings, which is reserved for weddings, funerals, and summer services and, when necessary, it can be utilized to house the overflow that gathers on holidays. This building, when grouped with the synagogue, composes an interesting mass, although there are instances, especially in the large cities where area space is at a premium, where one tall building houses both the social and the religious activities, the synagogue occupying one or two of the lower floors.

History has revealed the fact that a distinct style of architecture existed in all countries at

all times, up to the beginning of the last century. Artists, therefore, were not embarrassed with the selection of decorative details, as all of them quite naturally used the same prevailing forms. And so with the designers of synagogues. They followed the existing modes without question, contenting themselves with the introduction of a few characteristic Jewish symbols to distinguish their buildings from those of their Christian neighbors.

At the beginning of the last century, however, all stylistic developments languished; indeed, art as a universal language became almost inarticulate, and the architects having nothing new to say, revival of the older forms of architecture was resorted to. For the first time in history the strange phenomenon occurred, that, in each country of the world, buildings of quite different styles were simultaneously in course of construction. America suffered the most. Owing to the lack of definite tradition and to the mixed character of the people, its architectural form became exaggerated and confused and the style of a building was determined by the personal predilection of the owner or the architect.

There is ever inherent in a people the desire to express their ideals in concrete form, and architecture has ever been the noblest medium. The Jews of to-day are no exception to this rule, and there is an urge among them, amounting to an almost passionate demand, that their religious ideas should find visible expression in the creation of their houses of worship. The difficulties of accomplishing this seem to be fourfold:

(a) The large mass of Jewish people, having assembled from many different countries, bring with them definite ideas as to what a synagogue "should look like," so that each community or

even each congregation has ideas of its own as to a proper artistic expression. And there is no central body to dictate, or even to suggest, a clarification of conflicting tastes.

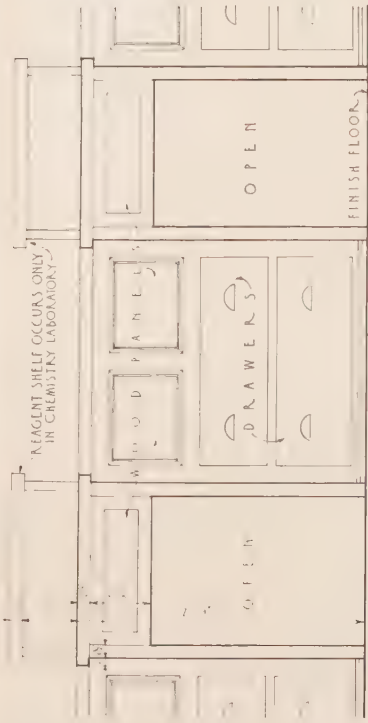
(b) The great size of the country makes difficult the communing of the artist and the study of existing monuments, so that each effort is individual and not part of a concerted movement.

(c) There are but few symbols that may be used to characterize the synagogue which will give instant recognition to a Jewish house of worship.

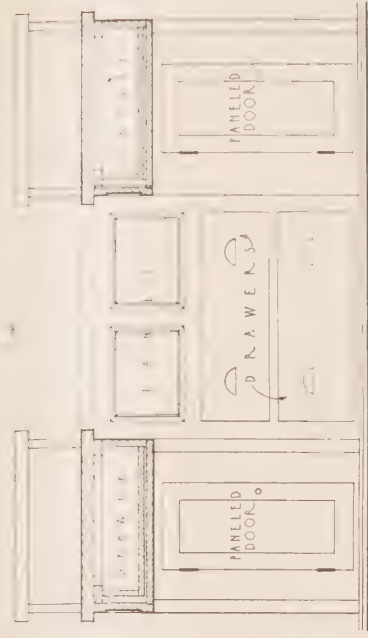
(d) The abandonment of the ritual reduces the interior of the synagogue to a simple lecture-hall, scarcely distinguishable from secular buildings serving the same purpose. For its proper functioning, the sight lines must be conserved, excellent acoustic properties must be attained, and there must be sufficient light in all parts of the room to permit of reading.

These practical requirements often conflict with those elements that have always produced deep religious emotions and have made the Gothic cathedrals so awe-inspiring. The repetition of piers and arches produces noble perspectives suggesting the infinite; voluting, soaring heavenward, exalts the spirit; and a dim religious light stirs the imagination and creates mystery—all must be abandoned to meet modern synagogal requirements.

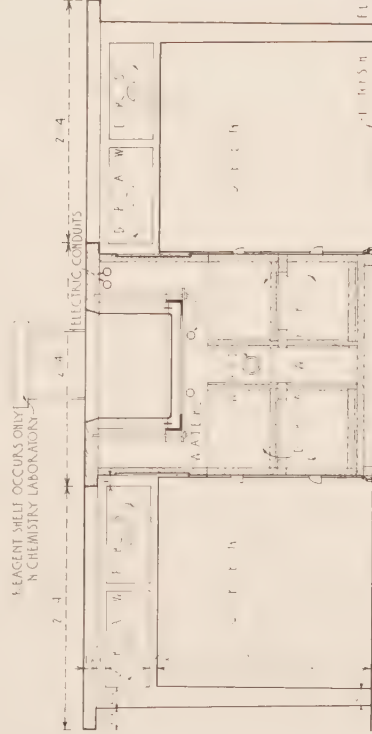
In going over the field of recent endeavor, it would seem that the styles selected by architects have narrowed down to only two: a free interpretation of the classic, or some form of the Byzantine. Each type has produced interesting and successful examples. There are many arguments in favor of each, but only time can tell which one will survive, or if indeed either will be final.



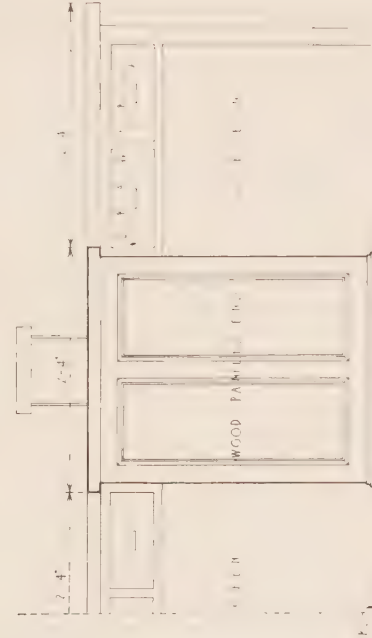
ELEVATION A-A



SECTION B-B



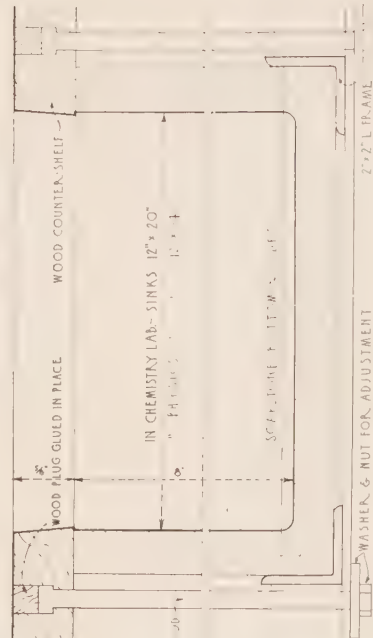
SECTION C-C



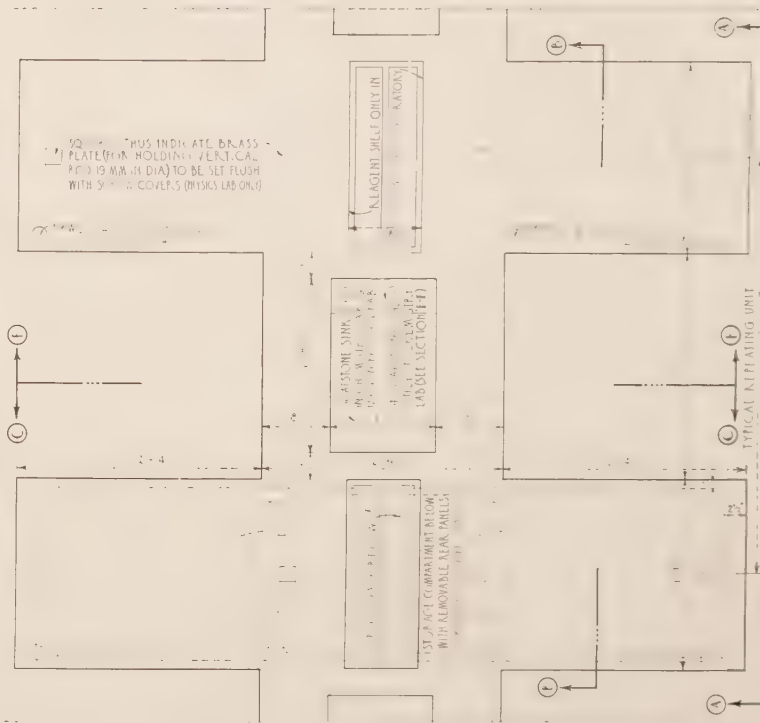
ELEVATION D-D



ELEVATION E-E

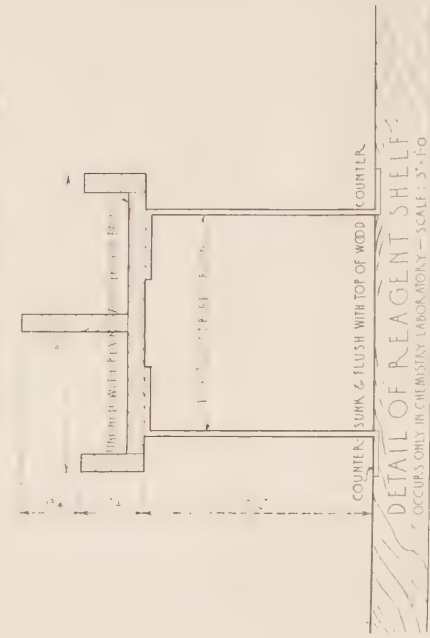


ELEVATION F-F

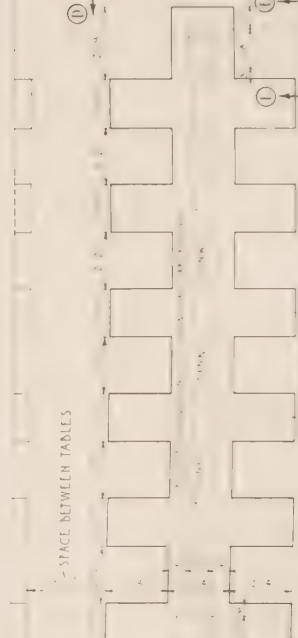


DETAIL PLAN OF TYPICAL UNIT

SCALE FOR ELEVATIONS & SECTIONS AS SHOWN ON LEFT & PLAN: 3/4" = 1'-0"



DETAIL OF REAGENT SHELF



SPACE BETWEEN TABLES

NOTES

DETAILS OF CHEMISTRY AND PHYSICS LABORATORY TABLE, LINCOLN SCHOOL, NEW YORK CITY
STARRETT & VAN VLECK, ARCHITECTS

The usual science laboratory table is a long rectangle in plan, providing for students working on opposite sides; sinks are arranged at intervals in the centre with about two feet of work space between sink and edge of table; the sides are provided with drawers and cupboards. The disadvantages of this type are that the student cannot conveniently use the sink, because of both its distance from the edge of the table and the awkwardness of reaching over bottles and burners. Having the table continuous makes no break from one student's apparatus and property to the next; and since the sides of the table consist of drawers and doors, it is uncomfortable to work either in a sitting or standing position because of having no space for feet or knees.

The table here illustrated obviates the disadvantages cited above by its plan arrangement, in that the sinks form an independent section in the centre of the table, easily accessible to students on both sides from it, and yet free from the working space which projects into the aisle. Students' work spaces are separated also, and are unobstructed underneath so that it is possible to be comfortably seated on a stool while working.

General Dimensions:

Sinks, 12" by 20" in the chemistry laboratory; 12" by 14" in the physics; both 8" deep; centred in counter-space of 2' 2" by 2' 4". Projecting part of table for work space, 2' 4" by 1' 10". Counter-top, 2' 9" above floor. Aisle space between tables, 3' wide.

Sink:

Soapstone sides and bottom; supported by 2" by 2" L-frame, hung from counter-shelf (see 3"-scale detail); in chemistry laboratory a soapstone shelf at one end, 4" wide and 3" down from top (see Section F-F).

Reagent Shelf:

Occurs only in chemistry laboratory (used to place bottles containing ingredients for experiments); 8½" wide over all; 6½" above counter-shelf; 1" by ⅜" strap-iron supports; finished with black acid-proof paint.

Pipes and Conduits:

Confined to space between two bottom drawers and immediately below sink (see Section C-C); accessible by removing panels at back of storage compartment, latter being under counter-shelf.

Materials:

All wood except soapstone sink and L-frame.



(See measured details on other side of sheet.)

SCIENCE LABORATORY, THE LINCOLN SCHOOL OF TEACHERS COLLEGE, NEW YORK
STARRETT & VAN VLECK, ARCHITECTS

EDITORIAL COMMENT

❖ VOL. LVIII, No. 3

ARCHITECTURE

SEPTEMBER, 1928 ❖

STRAWS

THE world's largest surety company has recently advised its agents to insert in their local publications an advertisement addressed to home builders and lenders of money on private construction work. In this the company's first item of advice is:

"Hire a good architect and engineer. It is always the best plan to have a good architect on the job. Also an engineer on the larger structures. *The fee you pay the architect is the cheapest investment you can possibly make*, since a good architect will save you his fee many times over in the construction of the building."

A survey of building operations in America by the F. W. Dodge organization, extending over twelve years, reveals the fact that at present some seventy per cent of all building is carried on under the professional direction of architects and engineers. The man who thinks he can muddle through even the most inconsequential building operation without an architect is moving off the stage.

ARCHITECTURAL DIVIDENDS

FACTS indicating definitely that good architecture is reflected in the balance sheet of the business investing in it are not easily assembled. In the case of a store which has remodelled its building, credit for the resulting gain in patronage is frequently given to the better merchandizing methods, rearrangement of departments, easier access, or one or more of a dozen accompanying changes, rather than to the architectural improvement. The following instance, therefore, is encouraging: A telephone company operating in a western city had for years shared equally with the traction company and the lighting company the available supply of skilled labor. Applications for jobs in the electrical branches came to each of the three big employers in about the same numbers. Then the telephone company erected a new building—one of the architectural landmarks of the city if not of the whole State. Almost immediately the ratio of applications changed. The tele-

phone company received twice as many applications as before, the other two employers dropping to half their former figures. Investigation showed that the electrician moving to the city was influenced by the new and impressive building. "This corporation," he said to himself, "is prosperous; its building gives the impression of solidity and civic pride; they evidently believe their business is here to stay and to grow. I think I'd like to work for them." And so, with double the number of workmen from which to select, the company found itself able to pick and choose; the level of efficiency rose; the labor turnover became smaller. Good architecture began paying an unexpected dividend.

COLOR AND HEAT

IT has long been a familiar fact that light colors on walls reflect more light—and consequently more heat—than do the darker colors. It has remained, however, for a series of careful tests made in Washington to give us actual figures for comparison. Thermometer readings were taken inside of metal containers, behind wood panels, and behind iron panels, all painted in different colors. When the official temperature of the air was 82 degrees Fahrenheit the comparative effects of the colors were as follows:

	AIR IN METAL STRUCTURE DEGREES F.	INTERIOR OF WOOD PANEL DEGREES F.	INTERIOR OF IRON PANEL DEGREES F.
Not painted.	102	114	126
Painted white.	102	104	106
Painted cream.	103	110	110
Painted aluminum. .	104	114	114
Painted orange.	107	118	118
Painted red.	108	126	122
Painted gray.	110	122	120
Painted blue.	108	120	122
Painted green.	109	124	126
Painted black.	114	130	130

On the basis of these findings, since the reflected heat must be hovering around, it should be considerably hotter for the pedestrian passing along a street of white painted houses than between the dark walls of an iron foundry—unless psychology enters into the equation to upset it.

New pharmaceutical building of Parke, Davis & Company in Detroit. Albert Kahn, Inc., Architects and Engineers



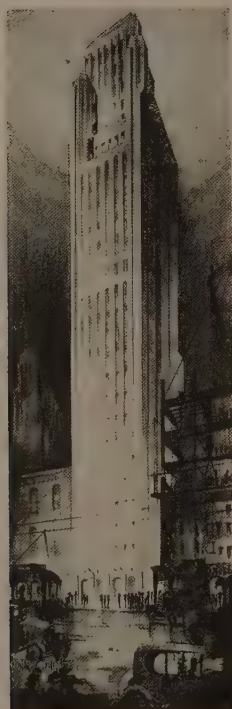
Architectural News



Oregon to build a State Office Building. Knighton & Howell, Architects and Engineers



The recently completed Masonic Temple in New Orleans. Sam Stone, Jr., & Co., Architects



Another proposed skyscraper for the Chicago Loop—the Bannerman Building. Robert S. De Golyer & Co., Architects



Chicago's proposed Merchandise Mart on Wacker Drive. Graham, Anderson, Probst & White, Architects

The proposed Milk Dealers' Bottle Exchange, Chicago. Richard Griesser, Architect and Engineer



in Photographs



United Hebrew Temple, St. Louis. Maritz & Young, Architects; Gabriel Ferrand, Associate

A Washington, D. C., landmark that is passing—the old brick capitol building, in use from 1814-1819



A proposed suburban golf club and apartment project for the Flossmoor district, Chicago. Frank D. Chase, Inc., Engineers and Architects



Statue of Meriwether Lewis, designed for the Missouri State Capitol by James Earle Fraser, Sculptor

BOOK REVIEWS

NEW TRAILS IN OLD SPAIN. By VERNON HOWE BAILEY. Illustrated with drawings by the author. 313 pages, $5\frac{1}{4}$ by $7\frac{3}{4}$ inches. New York: 1928: J. H. Sears & Co., Inc. \$3.50.

It is not expected of an artist with brush or pencil that he can write, but Mr. Bailey can and does. His wanderings through Spain, both over the beaten track and along lesser-known byways, are made vivid by his words no less than by his drawings.

THE A B C OF PLASTERING. By A. H. TELLING. With an Introduction by T. P. BENNETT, F. R. I. B. A. 235 pages, 5 by $7\frac{1}{2}$ inches. Illustrated with diagrams. Printed in Great Britain. New York: 1927: Oxford University Press, American Branch. \$2.85.

A book for the apprentice and craftsman in plaster-work, explaining materials, tools, methods, as practised in England, where plastering long ago became almost a fine art.

MAJORCAN HOUSES AND GARDENS. A Spanish Island in the Mediterranean. By ARTHUR BYNE and MILDRED STAPLEY. 17 pages of text and 188 plates, $12\frac{1}{4}$ by 16 inches, with a bibliography and index. New York: 1928: William Helburn, Inc. \$25.

The publication of a new book by Mr. and Mrs. Byne is always a treat. We have come to count confidently upon their discriminating judgment in selection of subject-matter, upon the superb quality of Mr. Byne's photographs and drawings, and upon the completeness of treatment in any field attempted. This new volume more than justifies our expectations. It is rich in suggestion for American adaptations from the Mediterranean.

TECHNOLOGIC PAPERS OF THE BUREAU OF STANDARDS: No. 349. Physical Properties of the Principal Commercial Limestones Used for Building Construction in the United States. By D. W. KESSLER and W. H. SLIGH. 30 cents. No. 366, Strength of Interlocking-Rib Tile Walls. By A. H. STANG, D. E. PARSONS, and A. B. McDANIEL. 10 cents. No. 337, Manufacture of Lime (superseding No. 16 under same title). 45 cents. No. 350, A Study of the Problems Relating to the Maintenance of Interior Marble. By D. W. KESSLER. 35 cents. No. 336, Comparative Tests of Six-inch Cast-iron Pipes of American and French Manufacture. By S. N. PETRENKO. 15 cents. No. 337, Soundproofing of Apartment-Houses. By V. L. CHRISLER. 5 cents.

DOMESTIC ARCHITECTURE IN RURAL FRANCE. By SAMUEL CHAMBERLAIN. 7 pages foreword, $9\frac{3}{4}$ by $12\frac{3}{4}$ inches, and 55 plates from sketches in lithograph drypoint, pencil, and wash; frontispiece a signed etching; all in a portfolio. New York: 1928: The Architectural Book Publishing Co., Inc. \$12.50

Samuel Chamberlain's drawings always bring delight, whether the subject be a study worthy of etching or the tiniest thumbnail of a window grille. As might be expected, and as the author points out, the collection makes no ambitious attempt to cover the broad field of its title. Chamberlain draws what appeals to him—and to us—and a large part of the portfolio is gleaned from Normandy and the Eure. The sketches are for the most part grouped, several to the sheet, and they approach facsimile reproduction on a dull-surfaced paper.

PLUMBING DESIGN. A Practical Handbook for Architects, Designers, Draftsmen, Plumbers, and Students. By A. L. NUGGY, M. A. S. M. E. 368 pages, 6 by 9 inches, with 248 illustrations, from diagrams and photographs. Easton, Pa.: 1928: The Chemical Publishing Co. \$6.

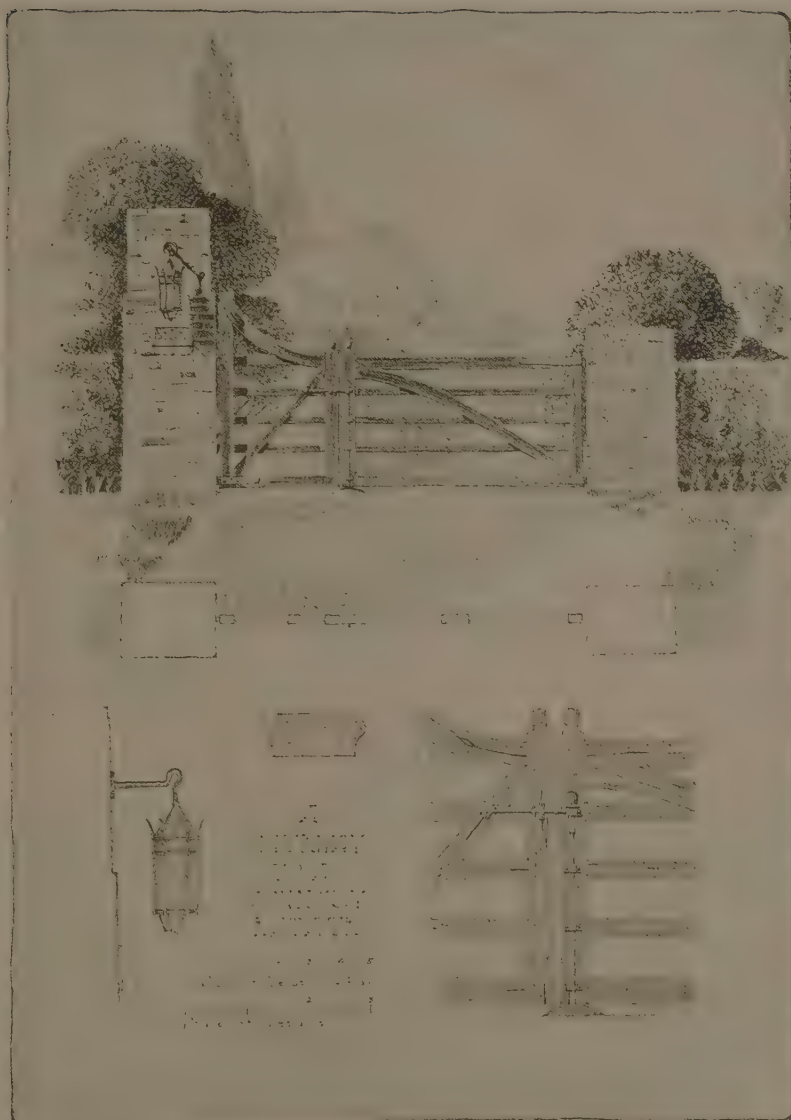
Another comprehensive handbook covering the theory and practice of modern plumbing, a subject which seems to be attracting the attention of an unusually numerous and capable group of modern technical writers.

GARDEN CINDERELLAS: HOW TO GROW LILIES IN THE GARDEN. By HELEN MORGENTHAU FOX. Foreword by ERNEST HENRY WILSON. 269 pages, $5\frac{3}{4}$ by $8\frac{1}{2}$ inches. Illustrated from photographs, and drawings in black-and-white and color. New York: 1928: The Macmillan Co. \$5.

An enthusiastic and well-authenticated guide for the selection and growing of lilies in American gardens. Written for the amateur gardener, it should prove a welcome addition to the landscape architect's library.

STEEL CONSTRUCTION. Compiled by the American Institute of Steel Construction, Inc.; LEE H. MILLER, Chief Engineer. 384 pages, $5\frac{1}{4}$ by 8 inches. Flexible binding. New York (285 Madison Ave.): 1927: American Institute of Steel Construction, Inc. \$1.50.

This excellent handbook contains the various standard specifications and Code of Standard Practice, full data regarding the standard shapes of various steel mills, and much other miscellaneous data regarding steel construction that is found elsewhere only in widely scattered sources.



DESIGN
AWARDED
FIRST
PRIZE

By
T. R.
Stephens,
Morgan-
town,
W. Va.

ARCHITECTURE'S Competition I—Report of the Judges

The programme for Competition I of the second series called for an Entrance Gateway to a country estate.

The judges have awarded the prizes to the following contestants: First Prize—T. R. Stephens, Morgantown, W. Va. Second Prize—Frances R. Dunn, Purdy's, N. Y. Third Prize—L. A. Winter, Westfield, N. J. Fourth Prize—Truman J. Mathews, Kansas City, Mo. Fifth Prize—R. H. Blatter, New York, N. Y.

Owing to the illness of Mr. Hood, Mr. Charles H. Higgins acted on the jury.

The first prize was awarded largely on the merit of straightforward expression, fulfilling all conditions, and the employment of simple and inexpensive material.

It is refreshing to find the introduction of rather original features like the side gate in design No. 1, the niche, containing the seal of the estate, in No. 3, and the use of the old carriage lamps in No. 4. Many of the unsuccessful drawings showed an overstrained effort toward elegance which was not the intention of the programme.



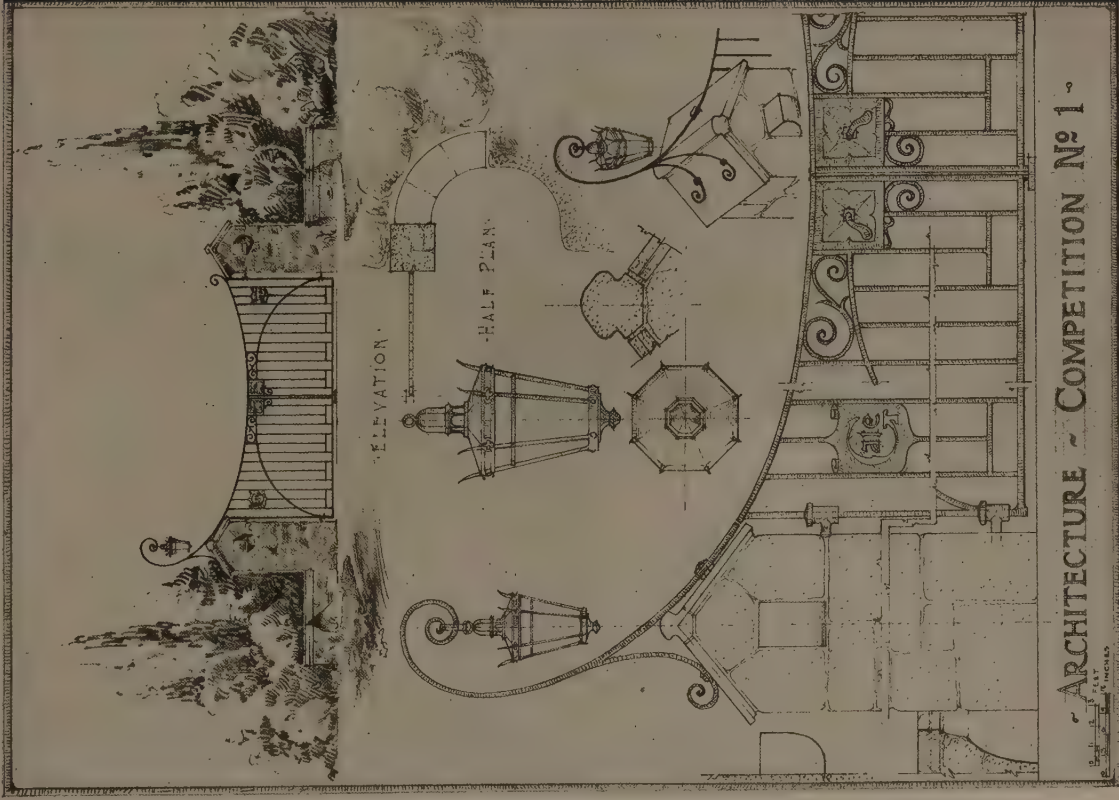
SECOND-PRIZE DESIGN

By Frances R. Dunn, Purdy's, N. Y.



THIRD-PRIZE DESIGN

By L. A. Winter, Westfield, N. J.



ARCHITECTURE'S COMPETITIONS

ARCHITECTURE'S second series of competitions is continued with the programme set forth below. There is plenty of time allowed for its completion—not so much, however, as to permit contestants to postpone action. The time to begin studying the problem is now. This page will not appear again before the closing.

The problems chosen are comparatively simple, requiring but one drawing, and that in a wide choice of media. There are four problems, one judged in each period of three months during the year.

The scale of prizes is maintained, with the three medals as additional incentive, all according to the "General Conditions" printed below.

GENERAL CONDITIONS

The Jury of Awards: Messrs. Raymond M. Hood, Ralph T. Walker, and the Editor of ARCHITECTURE.

Compensation to Competitors: ARCHITECTURE will pay to the winners of each competition, immediately after receiving the jury's judgment, the following

For Design placed First . . .	\$150.00
" " " Second . .	75.00
" " " Third . .	30.00 in books*
" " " Fourth . .	20.00 in books*
" " " Fifth . .	10.00 in books*

*These to be chosen from the Art and Architectural list of Charles Scribner's Sons.

In addition to the above awards, which are made for each one of the quarterly competitions, ARCHITECTURE will present three medals at the end of the fourth competition, one of gold, one of silver, and one of bronze, to the three designs chosen from among the quarterly awards which, in the opinion of the jury, show the greatest merit in design.

Eligibility: Architects, students, and draftsmen are invited to enter one or all of these competitions. It is *not* necessary that a competitor be a subscriber to ARCHITECTURE. A competitor may submit one or more designs in any of these competitions, but not more than one prize will be awarded to a competitor in each.

Requirements: One sheet (paper, not card-

board) only is required for the presentation of each design. It must be exactly of the size indicated in the sketch diagram herewith, the border margins left blank except for the nom de plume or other identifying device. The drawing may be in line or wash, or both, but if in wash it should be in monochrome, preferably in India ink. Indicate all scales graphically. To preserve the anonymity of drawings, each is to be signed with a nom de plume which is

also written upon the outside of a blank white envelope containing the competitor's name and address. Drawings may be sent flat or rolled, and are to be addressed "ARCHITECTURE, Competition No. II, 597 Fifth Avenue, New York, N. Y." The closing time given below is for receipt of entries at the office of ARCHITECTURE, rather than the closing by postmark date—this being necessary in order that judgments can be made and published in the following issue of the magazine. In justice to all, no questions regarding the competitions can be answered.

Drawings awarded prizes become the property of ARCHITECTURE for publication and for any other use at the publishers' discretion. Other drawings will be returned to the senders if postage is included.



COMPETITION II. Closing November 1, 1928, at noon

It is required to design the façade of a gift shop in a village. The building is to be a two-story one, the proprietor's apartment being on the second floor, reached from inside the shop. The frontage is thirty feet, and in addition to the entrance there will be display-window space. In character the façade should be inviting,

sprightly, but not bizarre. It should reflect the function of the shop, which is for people of more than average good taste.

Provide for the shop's name. Show front elevation at $\frac{1}{4}$ -inch scale, with plan or section (or both) of front. Add larger-scale details if desired.



Battery Place, New York
From the etching by
William Walcot, F. R. I. B. A., R. E.

*By permission of the publishers, Messrs. A. C. & H. W.
Dickins, London and New York*



West Forty-second Street, New York
From the etching by
William Walcot, F. R. I. B. A., R. E.
By permission of the publishers, Messrs. A. C. & H. W.
Dickins, London and New York



General view from the southwest

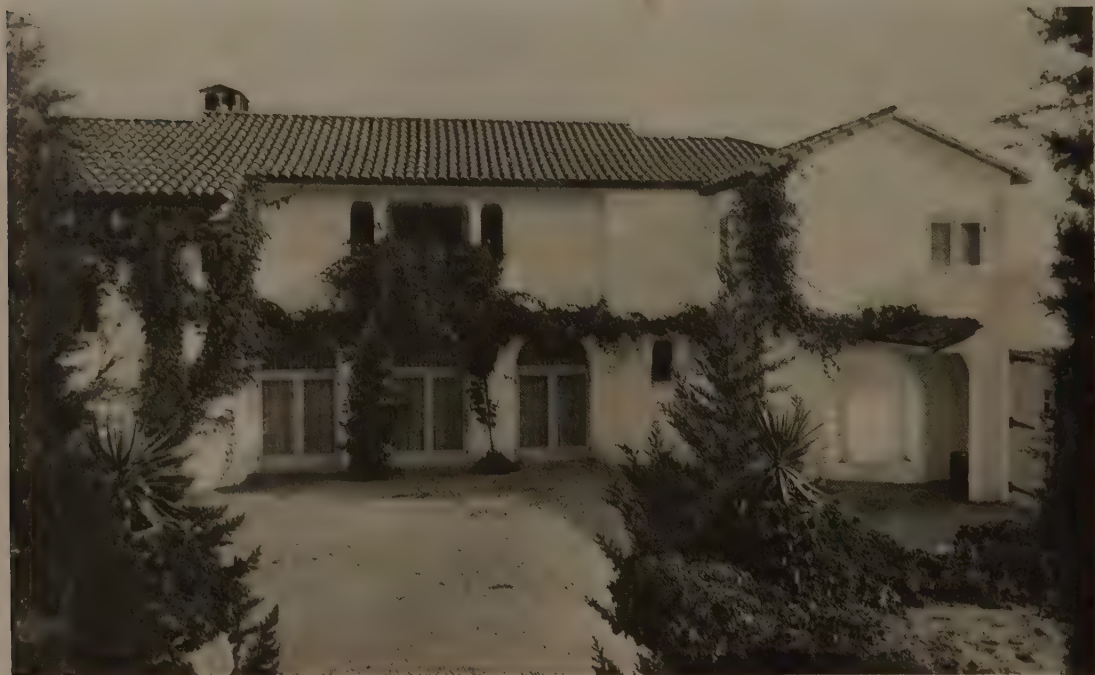
The panoramic view of the valley of Montecito and the distant Channel Islands is magnificent from the south terrace. The house is pure white, the sash painted blue-green. The roof is of red-brown, hand-made roofing-tile and the roof soffits are stained tobacco brown. The floor tiles are brown-red and the stone pavement is of sandstone, quarried on the site of the house.

THE RESIDENCE OF MRS. ROBERT Y. HAYNE, MONTECITO, CALIF.
CARLETON MONROE WINSLOW, ARCHITECT

Photographs by Faulding



West elevation



Interior court or patio

THE RESIDENCE OF MRS. ROBERT Y. HAYNE, MONTECITO, CALIF.
CARLETON MONROE WINSLOW, ARCHITECT



Inside patio



The south terrace

THE RESIDENCE OF MRS. ROBERT Y. HAYNE, MONTECITO, CALIF.
CARLETON MONROE WINSLOW, ARCHITECT



The long hall



Drawing-room looking into hall

THE RESIDENCE OF MRS. ROBERT Y. HAYNE, MONTECITO, CALIF.

CARLETON MONROE WINSLOW, ARCHITECT



The dining-room



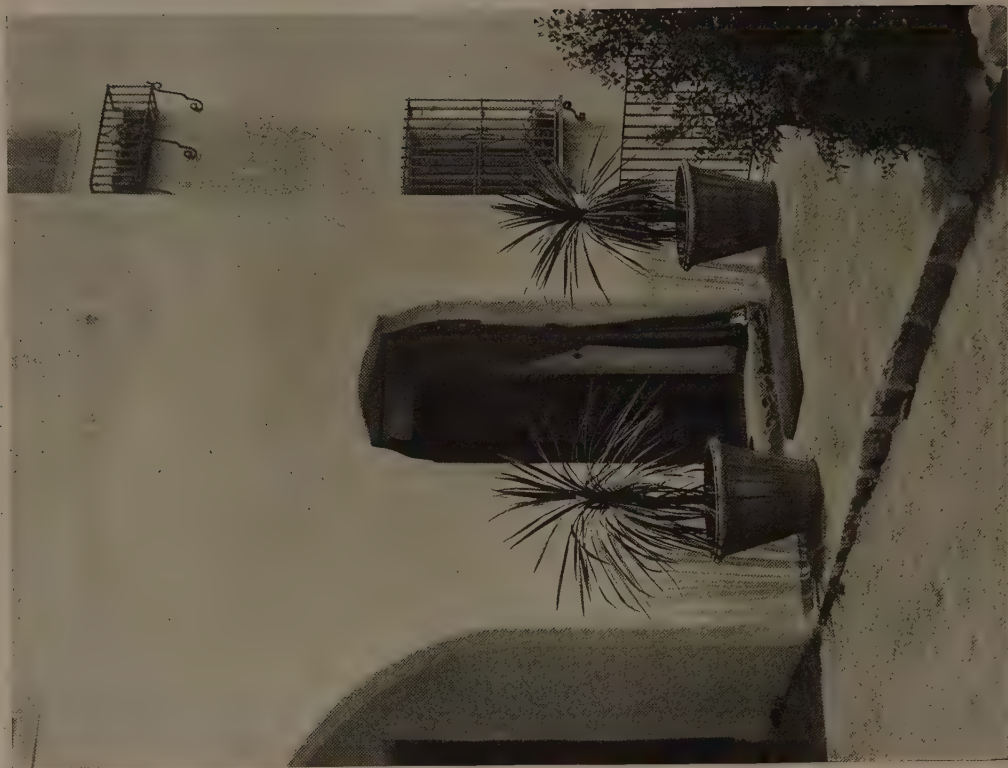
One of the guest rooms

THE RESIDENCE OF MRS. ROBERT Y. HAYNE, MONTECITO, CALIF.

CARLETON MONROE WINSLOW, ARCHITECT



Detail of south elevation



The front entrance-door

THE RESIDENCE OF MRS. ROBERT Y. HAYNE, MONTECITO, CALIF.
CARLETON MONROE WINSLOW, ARCHITECT



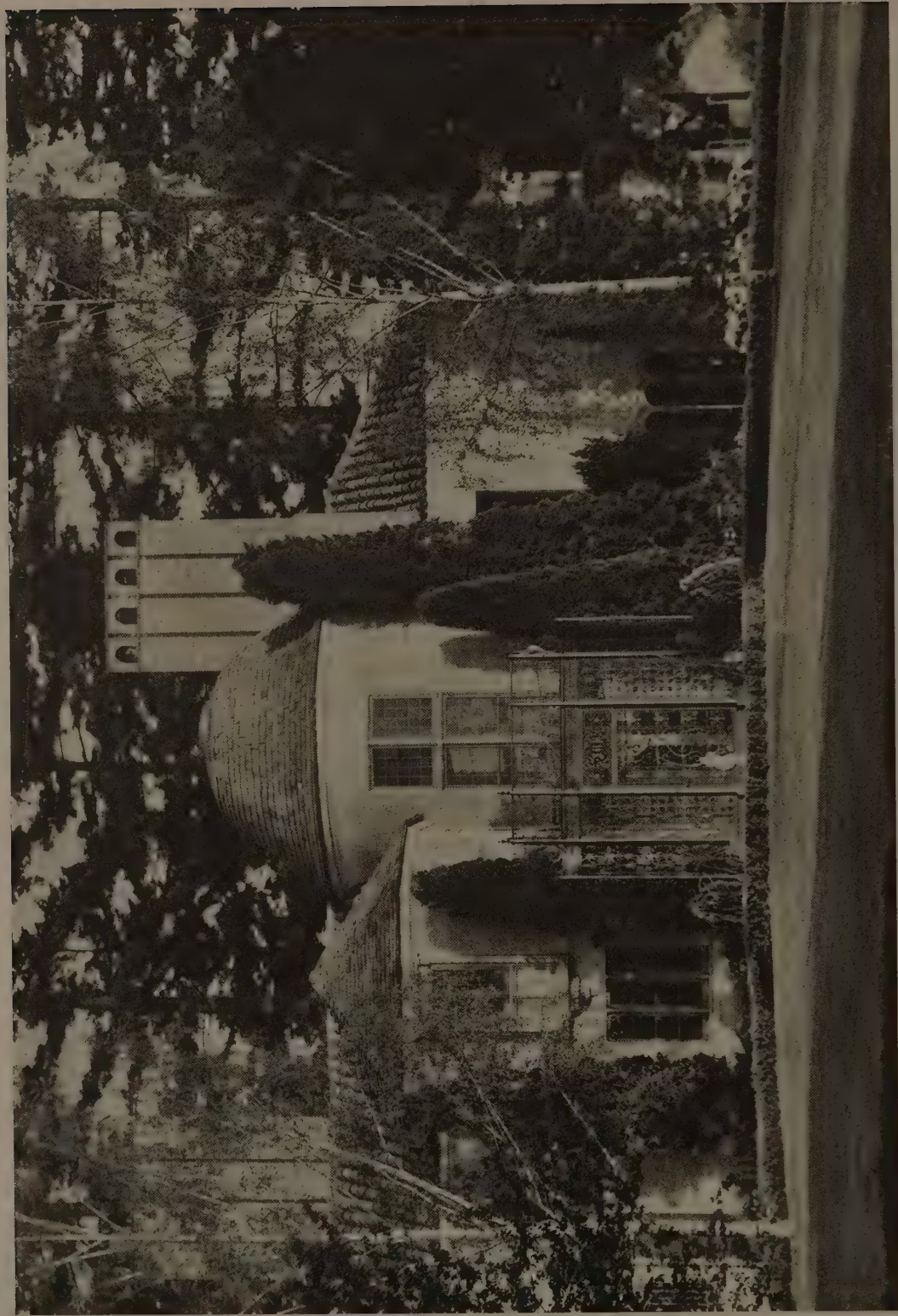
Entrance view



Garden and swimming-pool

THE RESIDENCE OF HARRY A. GREEN, PORTLAND, ORE. HERMAN BROOKMAN, ARCHITECT

Photographs by S. Ninmaiyo



Entrance elevation

THE RESIDENCE OF HARRY A. GREEN, PORTLAND, ORE. HERMAN BROOKMAN, ARCHITECT



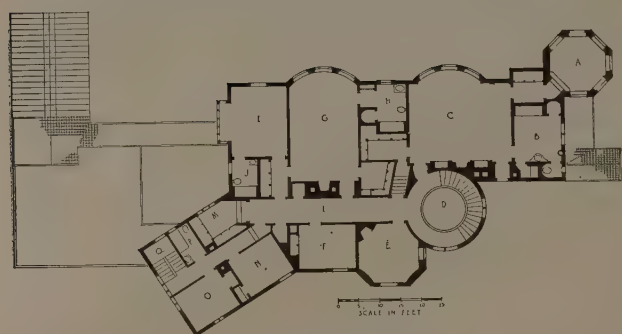
Garden elevation

THE RESIDENCE OF HARRY A. GREEN, PORTLAND, ORE.



Detail

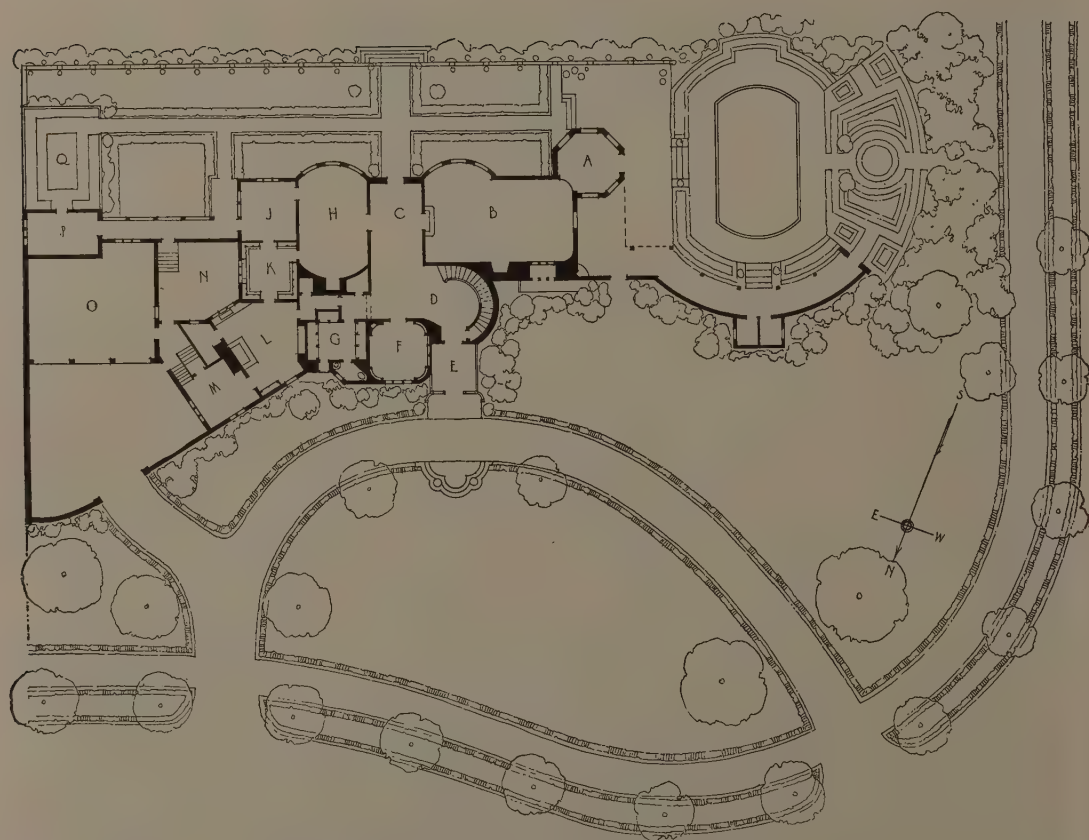
HERMAN BROOKMAN, ARCHITECT



Second-floor plan

SECOND-FLOOR PLAN

- A—Sun room
- B—Owner's bath
- C—Owner's bedroom
- D—Main stair
- E—Daughter's reception-room
- F—Maid's room
- G—Daughter's room
- H—Daughter's bath
- I—Guest room
- J—Guest bath
- K—Lift
- L—Hall
- M—Sewing and linen room
- N—Maid's room
- O—Maid's room
- P—Maid's bath
- Q—Service stair



First-floor plan and landscape layout



Detail

THE RESIDENCE OF HARRY A. GREEN, PORTLAND, ORE.

HERMAN BROOKMAN, ARCHITECT



Main entrance

THE RESIDENCE OF HARRY A. GREEN, PORTLAND, ORE.

HERMAN BROOKMAN, ARCHITECT



The Architectural Clinic

ON MOUNTING TRACING-PAPER



TO mount tracing-paper is almost a trade secret or, more accurately, almost a lost art. Several decades ago Beaux-Arts students were permitted to mount tracing-paper for *projet* presentations, but it has since become strictly *hors de concours*. Whether it was because the process resulted in too great a saving of time for the men in *charrette*, or because they bungled the delicate operation with wrinkles, is uncertain. However, the fact still flourishes that to mount tracing-paper is a tremendous time-saver in architectural pursuits, though it has gone out of vogue with lack of practitioners.

The employment of mounted tracing-paper sketches is particularly suited to modern warfare. If several schemes for the client must be rushed out while he dashes about with a two-week option on certain property, each can be sketched over the same skeleton elevation, then mounted or "floated," and rendered in any medium when dried out. Before such studies are mounted they may be hurriedly blue-printed as convenient records in case any further need of them develops while the client possesses the original. In any other method the original must be photostated or photographed, and not only costs more but is not a bona-fide facsimile to the exact scale. The ability to mount tracing-paper earns a living for no few renderers, for it is simply a matter of farming out the "set-up" to a henchman, tacking down a piece of rather textured tracing-paper over it, rendering on the tracing-paper either completely or partially, and then mounting it. If to be a strictly pencil affair, the complete rendering battle is advisedly waged before mounting, for after becoming a part of a mounting-board the texture changes and the paper responds less sympathetically. If it is to be a water-color rendering, the paper when mounted accepts no end of indignities; in fact, is as accommodating as most specially prepared smooth water-color papers. In this day of speed necessity it is a financial asset to know the habits of tracing-paper—before, during, and after the process of being mounted. There is only one drawback for plans or accurate elevations, in that tracing-paper stretches when wet—about $\frac{1}{8}$ inch to the foot in one di-

rection and about half of that the opposite way.

One of the most important considerations in making a perfect mount is to forget no accessory. An absent sponge or blotter may ruin an entire operation. The next important necessity is *never to become excited*, no matter what occurs. With all the necessary accessories at hand no seemingly fatal catastrophe can prevent the final result from being creditable if beads of cold perspiration, and all that accompanies them, are restrained. There are several methods of mounting tracing-paper, but all are alike in these two respects.

All the necessities in making a mount or "float" of tracing-paper are usually on hand in all offices, with the exception perhaps of large white desk-blotters. These are essential for the methods here described, and the experimenter should procure some—six in number at least, and *white* in color. The blue-printer or supply house usually fills the order by sending green ones. It is assumed that the sheet of tracing-paper to be mounted has been lightly sprayed with fixative, and been trimmed to the borders. Another sheet of the same weight of paper and approximately the same size should be cut. Any good white library paste should be thinned to the consistency of city cream. This should be thoroughly mixed and all hard parts eliminated; also, more should be prepared than is judged necessary, because a dearth at the essential time is fatal to success. A brush to apply this diluted paste is most efficient when it is rather flat and about one-half or three-quarters of an inch wide; almost any paint shop will yield a satisfactory specimen. A fair-sized pan containing a pint or more of water, a soft sponge at least two or three inches across, a towel, several large thumb-tacks, and an ordinary drafting-table dustbrush complete the paraphernalia. It is assumed that the half-dozen white blotters are at hand, as well as a paste jar, or any object which can readily be grasped in the hand and which has a smooth bottom.

When all these accessories are in readiness the mounting-board is brought out and, if unnecessarily large, is cut so as to have considerably wider margins than is finally desired. After some practice two dots near the top edge

can be placed to locate the suitable position for the tracing-paper, which can be made to conform exactly with its two upper corners, but for the first few operations there are greater worries than saving the time later consumed in border trimming. An assistant is instructed to stand at one side of the mounting-board (Fig. 1), holding

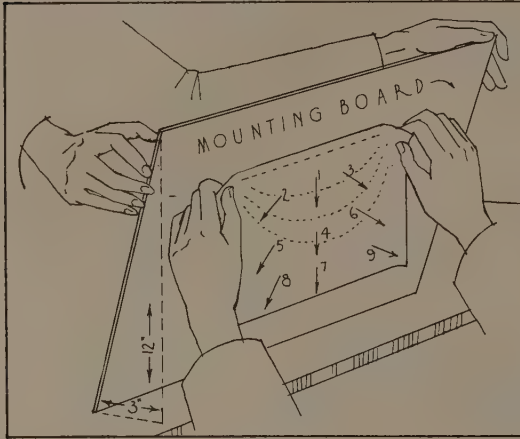


Figure 1

the board at the two upper corners, and using his one forearm to maintain a true edge; if the mount be large the board will have a tendency to bulge in or out along the top edge—a condition which prevents perfect results.

A clean piece of heavy paper (larger than the tracing-paper) is thumb-tacked down on the drafting-table. On it, the tracing-paper is held at one corner with the rendered face down, care being exercised not to puncture the tracing-paper with the thumb-tack; only the flange of the tack should hold the paper in place. The diluted paste is then spread evenly over the rear and upturned side of the tracing-paper. It must be manoeuvred so that only a minimum of paste is permitted to reach the front face in its tendency to ooze under the edges. A little practice renders the paste application a simple process. It is usual that some parts of the paper will have a tendency to dry out quicker than others, but by squinting along the surface it can be determined when every square molecule is glistening with moist paste. It is very necessary that no parts should escape unscathed, or when dry the mounting will show up a lighter color wherever there has been no paste.

When the paste has been distributed, the operator must act quickly before spots begin to dry. To prevent finger-marks it is well to dip

the hands into the pan of water and then dry them gingerly on the towel. By this time the assistant is holding the mounting-board in a convenient place, tipped forward at an angle as shown in Figure 1. The chief operator then picks up the two top corners of the tracing-paper (he may have to use a knife or divider point to disengage the tracing-paper from its horizontal position), and then the really crucial moment arrives. The tracing-paper must be held so that the top edge is straight, which means that it must be taut to a certain degree; if, however, there is too much strain the corners of the paper will tear off and the tracing will drop in a miserable heap on the floor. If this happens and one does not become excited, it is merely a matter of picking up the sheet, placing it on a drawing-board, adding water carefully with a sponge so that the paste will not dry, and opening out the sheet as it was before the dilute paste was applied; then it is a masseur's problem of gently sponging off all dirt which may have collected on the front face of the drawing, after which it can be turned over and a new coat of paste applied. Assuming, however, that no such unlucky accident happens, it behooves the operator to be certain, when the top edge of the tracing-paper touches the mounting-board, that it is in a straight line. If it is not he is in for trouble, since wrinkles will form as indicated by the dotted curved lines in Figure 1. If the tracing-paper starts off by being applied in a straight line, its own weight and tendency to cling to the mounting-board will almost take care of the even adhesion, provided, too, that the mounting-board is being held at the correct angle. It may be suggested that for the first try it is better to have this angle too great rather than too vertical; about three inches off the vertical in a foot is a good average. After the tracing-paper has adhered along its top edge, it should be encouraged to continue smoothly by using the tip of the dust-brush, gently giving the paper a short down stroke in the middle for a few inches (Fig. 1, arrow 1), then toward the left (arrow 2), then the right (arrow 3), followed by brushing in the order of the other arrows indicated (4, 5, and 6; then 7, 8, and 9).

If there are no wrinkles in the tracing-paper at this stage, it is exceptional luck; usually that happens only with a blank piece of paper. If there are hills and dales it is no great worry. It is advisable to lay the mounting-board down in a cleared space on a table (Fig. 2), and lift

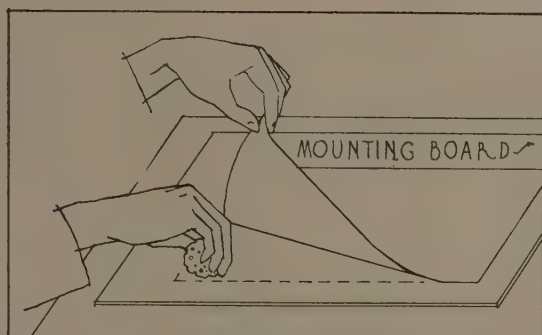


Figure 2

up one of the corners nearest the largest wrinkles. It will be noticed that where the wrinkles have occurred the mounting-board is dry; the cure is to run a moistened sponge over this area, followed by a few strokes of the dilute paste-brush until all is glistening wet. As the paper is then slowly lowered it automatically comes down practically flat. If there have been enormous wrinkles the width of the sheet it may be necessary to lift up two adjacent corners simultaneously, and have some one administer sponge and paste as described. This treatment will leave the mounting fairly smooth if properly done, and it then becomes simply a matter of rubbing down the paper until all the redundant paste is squeezed out, at the same time making the tracing-paper stick once and for all. By this time some of the surplus paste may be hovering around the edges; it is well to pick it up with a damp, squeezed-out sponge. Next in order is to take one of the white blotters and place it over the tracing-paper. Holding it securely so that it cannot slip (it is disastrous if it should), the other hand is used to press down from the centre of the drawing outward toward its edges. This squeezes out the bulk of the paste, which should be mopped up by the damp sponge after removing the blotter. A fresh blotter is laid

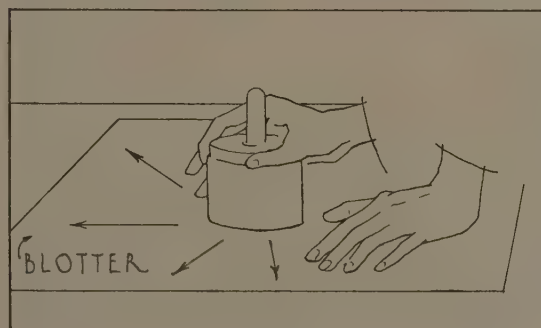


Figure 3

over the tracing-paper, and this time a glass jar (or some similar object which can be easily held and which is perfectly smooth on the bottom) is used for rubbing from the centre of the tracing-paper toward the edges, as shown in Figure 3. After the entire area has been ironed over once or twice, it is well to take up the blotter and use a fresh or dry one, repeating the rubbing until all the bubbles of paste and air have been squeezed out and the surface presents a uniformly flat appearance. During this rubbing-out process two factors are important: to hold the blotter firmly with the one hand, and to bear down with a heavy, even pressure. It is better to do too much "ironing" than have the paper peel later from lack of it.

After a damp sponge has washed off any stray streaks of paste which might appear along the edges, and after drying out, the front face of the mount is finished. However, if no similar piece of paper were mounted on the back of the mounting-board, it would curl up like a half-barrel. The twin piece of paper, cut to be the same size as the mounted piece, is then treated exactly the same as the first which has been described, but according to all the laws of luck and general practice, since it is blank and is not a valuable drawing, it will cause no trouble whatsoever. When it is in place, the mounting-board should have clean blotters or tracing-paper placed over its top face, then several layers of newspaper or other paper above and below, before marble samples, catalogues, or any other weighty matter is evenly piled upon it. The dampness will seep through for a surprising thickness, so that no library books should be used unless properly insulated by telephone directories or the like. An hour usually suffices for drying. After water-color washes or a bath of fixative have been applied it is well to dampen the reverse side of the mount slightly, and again dry it out for a short while under weights as described above.

The method described is satisfactory for drawings up to about two feet for their greatest dimension. Beyond that it is difficult to hold the top edge straight enough without the corners pulling off when in the moist stage. For mounting larger sheets of tracing-paper it is safer and easier to employ the method shown in Figure 4. The sheet is moistened with paste on the rear side, the same as for the other method, and is then picked up by two persons and held directly over the mounting-board. The corners are held sufficiently high so that the

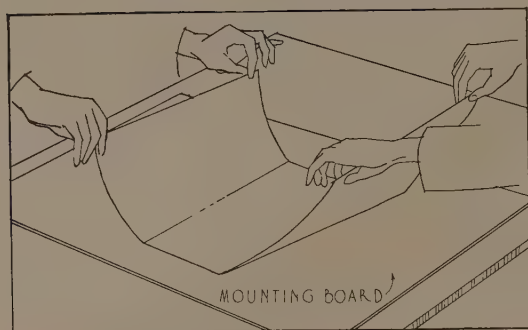


Figure 4

paper touches the board only at its middle portion; when this centre area is adhering without wrinkles and seems aimed in the right direction, the corners are gradually lowered. Wrinkles can be eliminated as described above, or by moistening the entire board with a damp sponge first. Concerning wrinkles it may be said that even though they first appear as pessimistically large

barriers, with sufficient elbow-wrist power they can be ironed down and out so as to be practically imperceptible.

One of the large furniture houses in New York City is said to have the ideal equipment for making perfect mounts of any size—a glass tabletop, on which the tracing-paper is placed face down. After the dilute paste is applied, a sponge washes up the paste where it spread on the glass. The paper has sprawled out absolutely flat on the glass, so that there are no opportunities for any wrinkles when the mounting-board is pressed down. A mark on the glass acts as a guide for the mounting-board, which is then laid on the paste-wet tracing-paper. When picked up the tracing-paper and mounting-board need the usual ironing out and a thin piece of paper on the back, but that is all. The one disadvantage in an architect's office is that such a method eliminates all the element of chance and all the zest of gambling—which, after all, are necessary ingredients in the practice of architecture.



FLOORING ON OPEN BEAMS



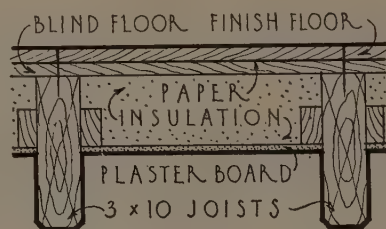
[A discussion supplementary to that in the Clinic for June, 1928, on Wood Floors]

ATREATMENT whereby joists may serve for holding up a floor and also as ornamental beams may be employed as a variation of the last-described construction. Instead of the cleats which hold up the subfloor between joists being below the boarding, they should be placed as shown in the sketch diagram, and some plaster-receiving board material nailed against them. If the joists are 3 by 10 or 12 inches, with 6 or 7 inches projecting below the plaster or plaster-board, they can be hand-adzed and stained. Where the cross-bridging or bracing occurs this may be housed in what would be the only false beam in the room. The best means to secure the greatest finesse for certain effects is to eliminate all cover moulds at the intersection of beam with plaster or plaster-board; probably if the latter be used no moulding would be required, whereas plaster might pull away sufficiently so that a crack would show, although it might be possible to fill up the offending slit with some plastic material.

In finishing floors most architects have had enough happy and unhappy experience to know what prescription is best followed. Machine

scrapers serve their purpose when the floor runs in one direction only, but in any pattern where the grain runs several ways, marks are always left across the grain by even the most expert handlers. For the patterned floor there seems no substitute for knife-scraping by an intelligent and energetic pair of arms. Subsequent sandpapering (by about number 1½) followed by light shellac is the usual practice in good work. Commercial waxes of the better grades are all dependable and are applied at least twice on a cloth, rubbing with steel wool between. The final polishing should be done in the European method of skating around with brushes and soft cloths underfoot, or by weighted brushes. In this operation machine-polishers are unobjectionable.

Section through floor showing the utilization of sturdier joists kept visible below





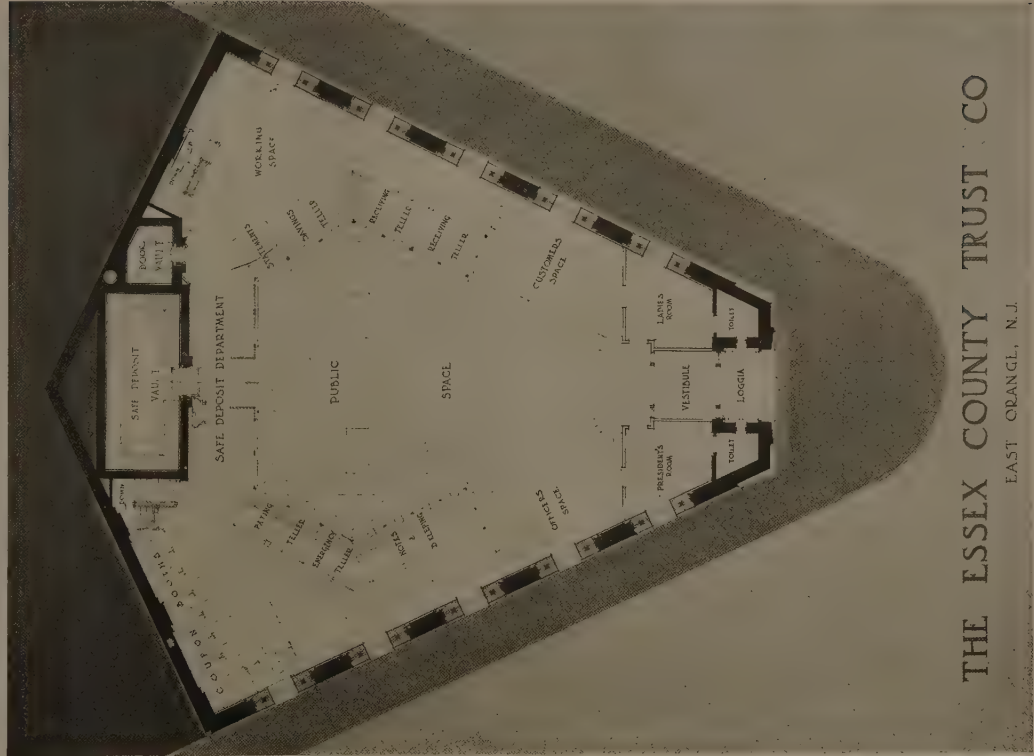
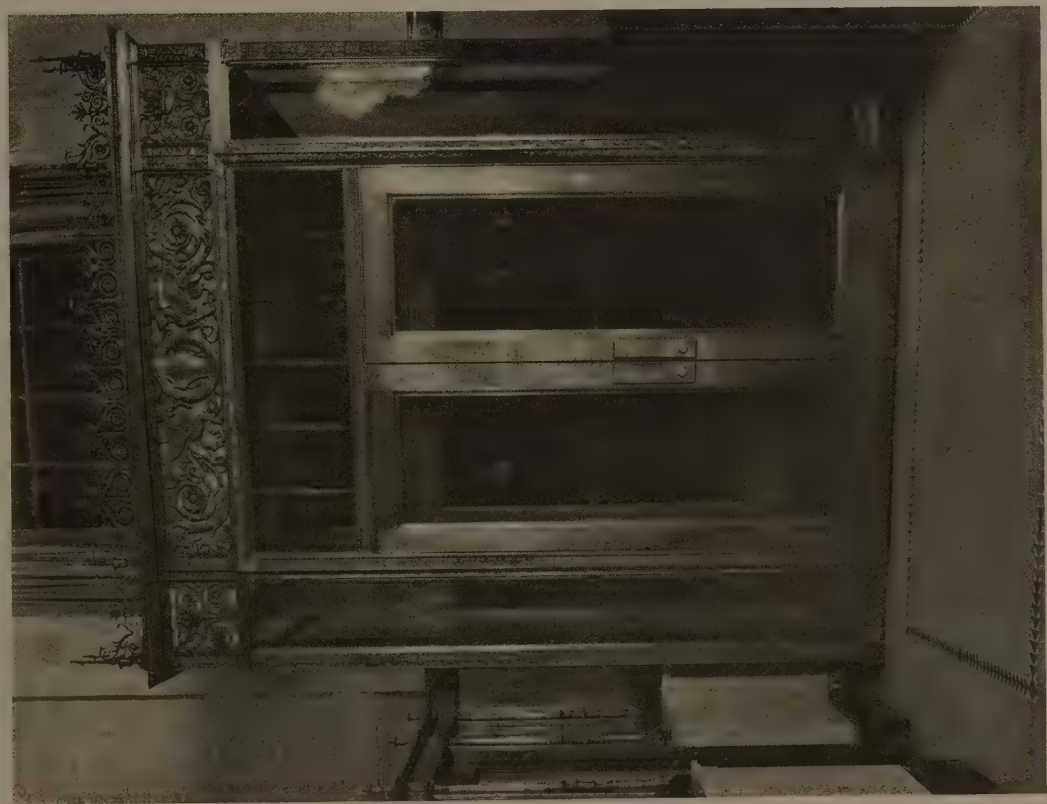
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ARCHITECTURE'S PORTFOLIO



OF GARDEN WALLS

❖ ❖ ❖ *Subjects of Previous Portfolios* ❖ ❖ ❖

PANELLING OF THE ENGLISH TYPES—	Jan., 1927	GABLE ENDS—	Oct., 1927
STAIRWAY DETAILS (GEORGIAN, EARLY AMERICAN, ETC.)—	Feb., 1927	COLONIAL TOP-RAILINGS OF WOOD—	Nov., 1927
STONE MASONRY TEXTURES—	Mar., 1927	CIRCULAR AND OVAL WINDOWS (CLASSIC AND RENAISSANCE)—	Dec., 1927
ENGLISH CHIMNEYS—	Apr., 1927	BUILT-IN BOOKCASES—	Jan., 1928
FANLIGHTS AND OTHER OVERDOOR TREATMENTS—	May, 1927	CHIMNEY TOPS—	Feb., 1928
TEXTURES OF BRICKWORK—	June, 1927	DOOR HOODS—	Mar., 1928
IRON RAILINGS—	July, 1927	BAY WINDOWS—	Apr., 1928
DOOR HARDWARE—	Aug., 1927	CUPOLAS—	May, 1928
PALLADIAN MOTIVES—	Sept., 1927	GARDEN GATES—	June, 1928
		STAIR ENDS—	July, 1928
		BALCONIES—	Aug., 1928

SUBJECTS IN PREPARATION FOR FUTURE ISSUES

Arcades and	Corner Cupboards	Garden Pools	Quoins
Colonnades	Clock Towers	Garden Shelters	Iron Railings
Cornices	Elevator Doors	Interior Paving	Rain-Conductor Heads
Balustrades	Driveway Entrances	Organ Cases	Stucco Textures
Belt Courses	Fences	Oriel Windows	Treillage
Brick, Moulded	Finial Urns	Overmantels	Verandas
Corbels	Spanish Fireplaces	Niches	Weathervanes

*Photographs showing interesting examples under any of
these headings will be welcomed by the Editor*



CHARLESTON, S. C.



FRANK J. FORSTER



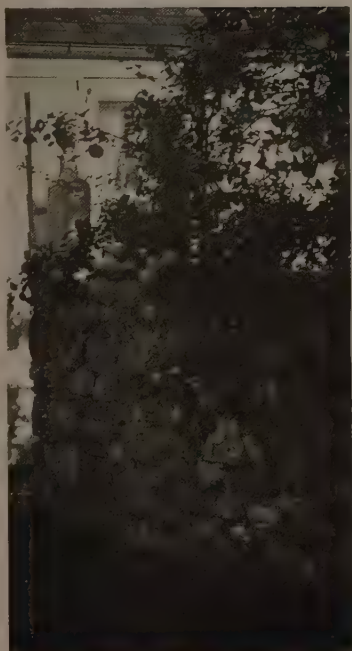
YORKTOWN, VA.



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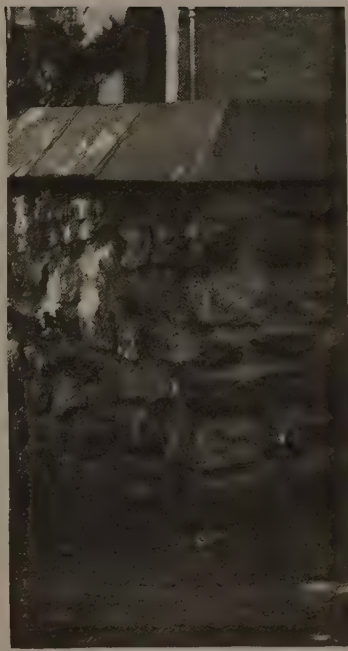
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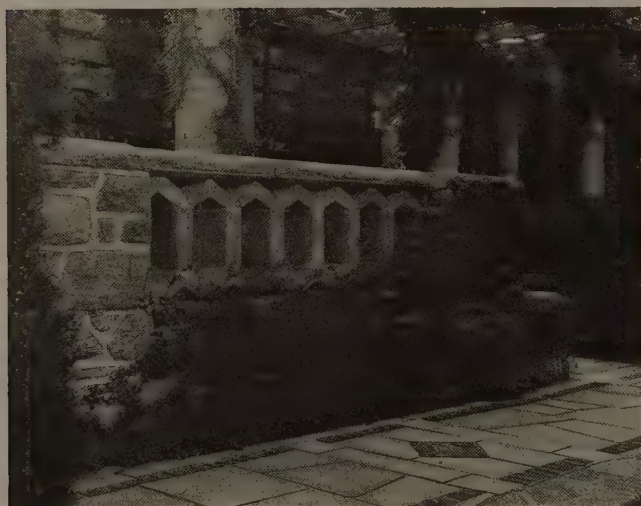
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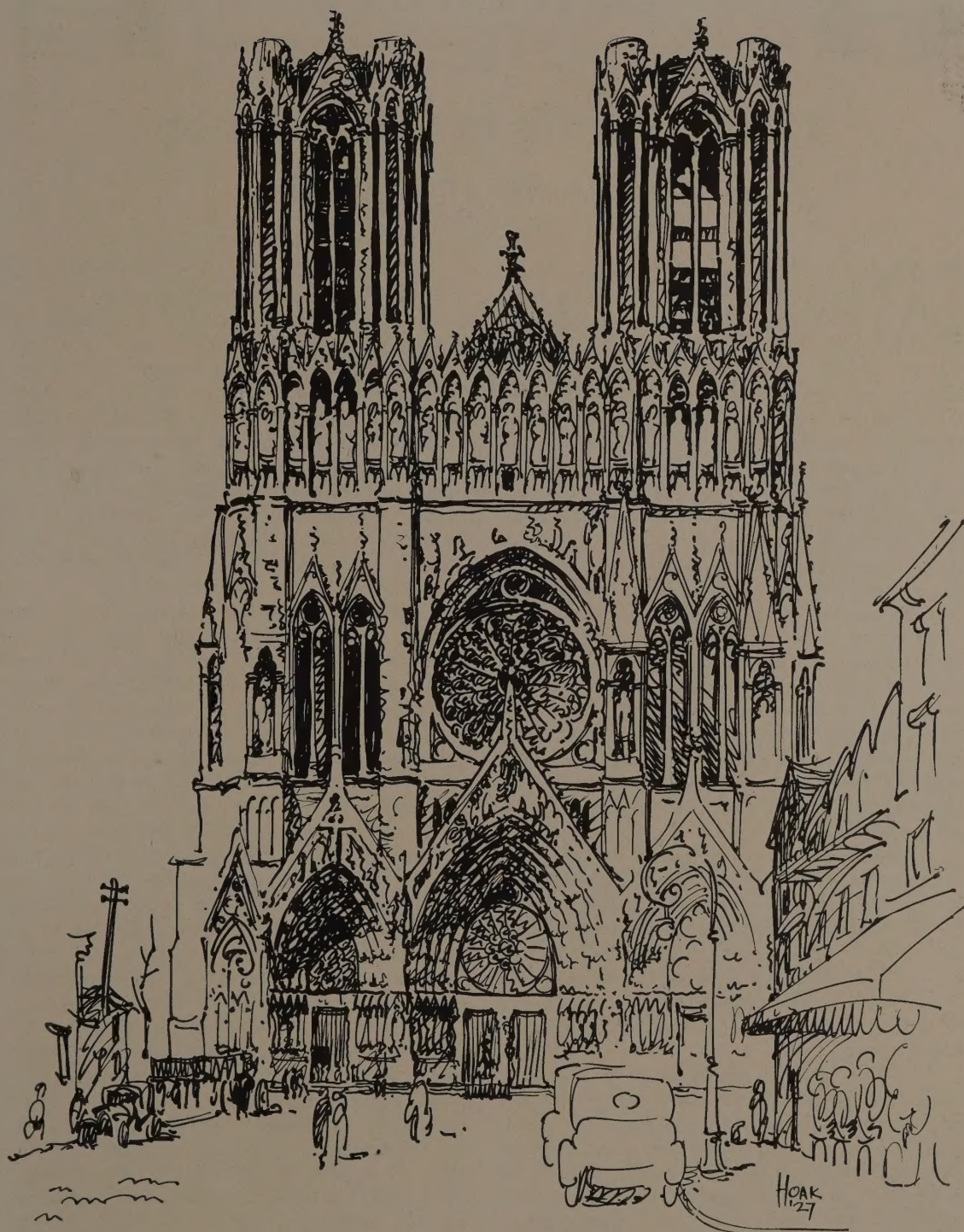
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CATHEDRAL AT RHEIMS

• Pen-and-ink Drawing by Edward Warren Hoak



CONTACTS

DEVOTED TO A BETTER UNDERSTANDING OF THE BUSINESS SIDE
OF ARCHITECTURE AND ITS RELATION TO THE INDUSTRIES



Curing the Ills of Construction

By Franklin D. Roosevelt

President American Construction Council

AS I had occasion to say in a statement to one of the branches of the industry, after a number of years' association with the American Construction Council which was organized by Secretary Hoover and myself, I am more and more convinced of the need for co-operation in the whole construction industry.

Two points I would stress. The construction industry is a whole, and we have learned what was not generally understood a few years ago, that the thousand parts of the industry are component and lean on one another for success. In the old days there was too much tendency to feel, for instance, that those interested in steel construction were necessarily antagonistic to those interested in wood construction; that brick manufacturers are merely rivals of the cement makers. To-day, however, we know that in construction as in so many other human activities, what makes for the good of one is apt to make, also, for the good of others. In other words, there is plenty of room for all if the industry as a whole is on a sound basis.

This, after all, is the American Construction Council movement—that progressive measures on the part of the construction industry shall be taken, and that its ills, when they exist, shall be cured not by governmental and court action but by the voluntary work of the industry itself. It is this that marks the movement as one of the big forward steps in American industrial organization.

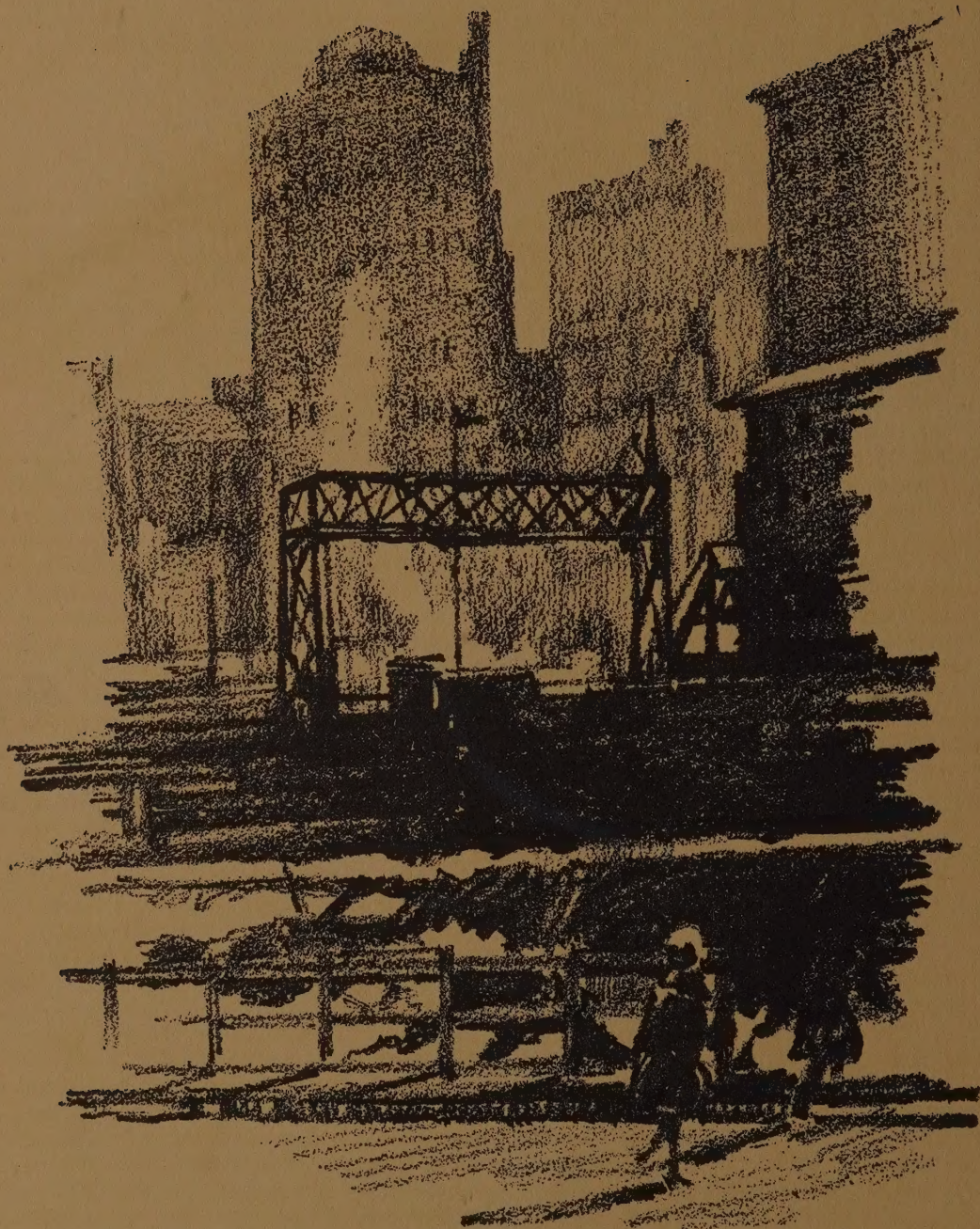
Too few persons visualize in a practical manner the vastness of construction and its importance in promoting the economic prosperity of the country. Moreover, many who believe this in principle do not adhere to it in every-day practice through the adoption of methods that make for sound development throughout the industry. Construction, unlike many industries, both creates and maintains wealth. How this wealth is created determines how well it can be maintained. Knowledge and

responsibility must go hand in hand in securing the desired results and they cannot go hand in hand unless the many branches of the industry work together on problems of mutual interest.

The Council has been engaged for several years in a co-operative campaign to encourage better building, having been the leader in this movement nationally. As an economic factor in our national life, the losses from poor construction, temporary construction, and dishonest construction, plus the appalling losses from unnecessary conflagration, would have paid the whole war debt of the United States and most of the European nations.

I should therefore like to picture to you the Council as a great educational and publicity force for the industry as a whole in reaching the public with regard to its problems. Its efforts along these lines should not be confined merely to particular problems, such as better building, reduction of construction peaks and depressions, better highways, commercial arbitration and the like, important as these are: but they should centre, with these particular problems in the foreground, toward the development of the real concept of construction in the mind of the public. The lack of clear understanding by the public of the construction industry as an industry is the basis of its many difficulties. Certain research functions would naturally accompany this programme of education.

In the last analysis the answer and the remedying of present conditions must be two-fold. The construction industry itself must work together instead of at odds with itself, and, under its leadership, the public of the country must learn the essentials of right construction. It is, after all, not the steel men, nor the brick men, nor the lumber men, nor the masons, nor the carpenters, nor the plumbers who are the constructors of modern homes in America. It is the general public in their homes, in their factories, in their transportation, who decide when to build and how to build.



ERIC THOMPSON. 1928.

[ARCHITECTURE]
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*Pennsylvania Railroad Yard, Philadelphia
From the drawing by Eric Thompson*